

## **Historic, Archive Document**

Do not assume content reflects current scientific knowledge, policies, or practices.



2TX326  
.A1U5

# Family Economics and Nutrition Review

## Special Issue

### *Food Guide Pyramid for Young Children*

#### Research Articles

- 3 Adapting the Food Guide Pyramid for Children: Defining the Target Audience  
*Etta Saltos*
- 18 Technical Research for the Food Guide Pyramid for Young Children  
*Kristin L. Marcoe*
- 33 Consumer Research: Food Guide Pyramid for Young Children  
*Catherine Tarone*
- 45 Factors Influencing Children's Dietary Practices: A Review  
*Alyson Escobar*
- 56 Expenditures on Children by Families, 1999  
*Mark Lino*

USDA  
NAT'L AGRIC LIBRARY  
200 OCT 31 1A 12:55  
CURRENT SERIAL RECORDS  
100/0/SERIALS BRANCH

#### Research Briefs

- 75 Are All Food Pyramids Created Equal?  
*Alyson Escobar*
- 78 Report Card on the Diet Quality of Children  
*Mark Lino, Shirley A. Gerrior, P. Peter Basiotis, and Rajen S. Anand*
- 81 Eating Breakfast Greatly Improves Schoolchildren's Diet Quality  
*P. Peter Basiotis, Mark Lino, and Rajen S. Anand*

510  
181  
C.A.  
Circled stamp

#### Research Summaries

- 85 Contribution of Away-From-Home Foods to American Diet Quality
- 90 The Rural Poor's Access to Supermarkets and Large Grocery Stores
- 93 Poverty and Well-Being in Rural America
- 96 Alternative Employment Arrangements
- 101 Factors Affecting Nutrient Intake of the Elderly
- 104 The Food Stamp Program After Welfare Reform

#### Regular Items

- 108 Federal Statistics: Children's Health
- 110 Research and Evaluation Activities in USDA
- 113 Journal Abstracts
- 115 USDA Food Plans: Cost of Food at Home
- 116 Consumer Prices
- 117 U.S. Poverty Thresholds

**Dan Glickman, Secretary**  
U.S. Department of Agriculture

**Shirley R. Watkins, Under Secretary**  
Food, Nutrition, and Consumer Services

**Rajen Anand, Executive Director**  
Center for Nutrition Policy and Promotion

**P. Peter Basiotis, Director**  
Nutrition Policy and Analysis Staff

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, sex, religion, age, disability, political beliefs, sexual orientation, or marital or family status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD).

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410 or call (202) 720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.



# Family Economics and Nutrition Review

**Editor**  
Julia M. Dinkins

**Features Editor**  
Mark Lino

**Managing Editor**  
Jane W. Fleming

**Contributor**  
Joan C. Courtless

*Family Economics and Nutrition Review* is written and published each quarter by the Center for Nutrition Policy and Promotion, U.S. Department of Agriculture, Washington, DC.

The Secretary of Agriculture has determined that publication of this periodical is necessary in the transaction of the public business required by law of the Department.

This publication is not copyrighted. Contents may be reprinted without permission, but credit to *Family Economics and Nutrition Review* would be appreciated. Use of commercial or trade names does not imply approval or constitute endorsement by USDA. *Family Economics and Nutrition Review* is indexed in the following databases: AGRICOLA, Ageline, Economic Literature Index, ERIC, Family Studies, PAIS, and Sociological Abstracts.

*Family Economics and Nutrition Review* is for sale by the Superintendent of Documents. Subscription price is \$12.00 per year (\$15.00 for foreign addresses). Send subscription orders and change of address to Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954. (See subscription form on p. 123.)

Original manuscripts are accepted for publication. (See "guidelines for authors" on back inside cover.) Suggestions or comments concerning this publication should be addressed to Julia M. Dinkins, Editor, *Family Economics and Nutrition Review*, Center for Nutrition Policy and Promotion, USDA, 1120 20th St. NW, Suite 200 North Lobby, Washington, DC 20036. Phone (202) 606-4876.

The *Family Economics and Nutrition Review* is now available at <http://www.usda.gov/cnpp> (see p. 121).

## Special Issue

### *Food Guide Pyramid for Young Children*

#### Research Articles

- 3 **Adapting the Food Guide Pyramid for Children: Defining the Target Audience**  
*Etta Saltos*
- 18 **Technical Research for the Food Guide Pyramid for Young Children**  
*Kristin L. Marcoe*
- 33 **Consumer Research: Food Guide Pyramid for Young Children**  
*Catherine Tarone*
- 45 **Factors Influencing Children's Dietary Practices: A Review**  
*Alyson Escobar*
- 56 **Expenditures on Children by Families, 1999**  
*Mark Lino*

#### Research Briefs

- 75 **Are All Food Pyramids Created Equal?**  
*Alyson Escobar*
- 78 **Report Card on the Diet Quality of Children**  
*Mark Lino, Shirley A. Gerrior, P. Peter Basiotis, and Rajen S. Anand*
- 81 **Eating Breakfast Greatly Improves Schoolchildren's Diet Quality**  
*P. Peter Basiotis, Mark Lino, and Rajen S. Anand*

#### Research Summaries

- 85 **Contribution of Away-From-Home Foods to American Diet Quality**
- 90 **The Rural Poor's Access to Supermarkets and Large Grocery Stores**
- 93 **Poverty and Well-Being in Rural America**
- 96 **Alternative Employment Arrangements**
- 101 **Factors Affecting Nutrient Intake of the Elderly**
- 104 **The Food Stamp Program After Welfare Reform**

#### Regular Items

- 108 **Federal Statistics: Children's Health**
- 110 **Research and Evaluation Activities in USDA**
- 113 **Journal Abstracts**
- 115 **USDA Food Plans: Cost of Food at Home**
- 116 **Consumer Prices**
- 117 **U.S. Poverty Thresholds**
- 118 **Index of Articles in 1999 Issues**
- 119 **Index of Authors in 1999 Issues**
- 120 **Reviewers for 1999 Articles**

---

### ***Would you like to publish in Family Economics and Nutrition Review?***

*Family Economics and Nutrition Review* will consider for publication articles concerning economic and nutritional issues related to the health and well-being of families. We are especially interested in studies about U.S. population groups at risk—from either an economic or nutritional perspective. Research may be based on primary or secondary data as long as it is national or regional in scope or of national policy interest. Articles may use descriptive or econometric techniques.

*Family Economics and Nutrition Review* has a new feature: Research Briefs. We define Research Briefs as short research articles. Our guidelines are found on the back inside cover of each issue.

We invite submission of Research Briefs; manuscripts may contain findings previously presented at poster sessions if not published in proceedings (except for abstract).

Manuscripts may be mailed to Julia M. Dinkins, Editor, *Family Economics and Nutrition Review*, Center for Nutrition Policy and Promotion. See guidelines on back inside cover for complete address.

# Adapting the Food Guide Pyramid for Children: Defining the Target Audience

Etta Saltos  
USDA Cooperative State Research,  
Education and Extension Service

Nutrition educators, as well as the 1995 Dietary Guidelines Advisory Committee, have identified a need for nutrition guidance specifically for children. Because of the variation in children's nutrient needs and eating practices, it is impractical to adapt one food guide for all children. The purpose of the present study, therefore, was to identify the best age group to target for an adapted Food Guide Pyramid for Children. Three potential subgroups between the ages of 2 and 18 were identified: preschool-age (2 through 6 years), school-age (7 through 11 years), and adolescents (12 to 18 years). Subgroups were ranked by reviewing the literature to determine whether the Food Guide Pyramid meets each subgroup's dietary needs, to consider each subgroup's specific nutritional or health problems that an adapted food guide could help address, and to examine user demand for a new food guide. A food guide adapted for use with parents and caregivers of preschool-age children was identified as the greatest need based on children's specific dietary requirements (higher fat intakes as recommended by the 1995 Dietary Guidelines and their need for smaller serving sizes) and user demand (requests from parents, caregivers, and nutrition educators).

**T**he USDA's Food Guide, designed to help all healthy Americans 2 years old and over use the *Dietary Guidelines for Americans* (38), and its graphic representation, the *Food Guide Pyramid* (Pyramid), have been distributed widely since the Food Guide was first introduced in the mid-1980's. The Pyramid has been used widely in a variety of materials (including posters, textbooks, school curricula, and computer software) by nutrition educators and has also been used by industry on food labels. In materials accompanying the Pyramid, USDA recommends that preschool-age children obtain at least the minimal number of servings from the five major food groups, but this age group can have

smaller servings from all food groups except the milk group (38). Nevertheless, nutrition educators have identified a need for nutrition guidance regarding the dietary needs of children,<sup>1</sup> and the 1995 Dietary Guidelines Advisory Committee has recommended that the development of separate dietary guidelines for children be considered (7). Adaptation of the Pyramid and its accompanying nutrition guidance materials specifically for children is an important component of the effort to help children apply the *Dietary Guidelines for Americans*.

<sup>1</sup>The term "children," in this article, refers to children and adolescents ages 2 through 18 years.



The purpose of this study was to define the target audience for a food guide that would be adapted for children by recommending subgroups within the 2- to 18-year age range and ranking the subgroups in order of greatest need based on dietary requirements and user demand for nutrition education materials. Materials reviewed for this study included journal articles, reference materials (including the Recommended Dietary Allowances and nutrition textbooks), and published and unpublished reports from government agencies. Criteria used to define and rank the subgroups included the following:

- nutrient needs of children,
- nutrition recommendations for children by authoritative bodies, such as the Dietary Guidelines Advisory Committee,
- nutritional status of children, including macronutrient and micronutrient intake and anthropometric measurements, and
- children's knowledge and attitudes regarding nutrition.

These criteria were used to define subgroups and to list facts in favor of and against adapting a food guide for each subgroup.

## Nutrient Needs of Children

The Recommended Dietary Allowances (RDA) provide information concerning children's nutrient needs, as well as the nutritional needs of the rest of the population (23). The 1989 RDA are expressed for the following age-gender groups: children, ages 1 to 3 years; children, ages 4 to 6 years; children, ages 7 to 10 years; males, ages 11 to 14 years; females, ages 11 to 14 years; males, ages 15 to 18 years; and females, ages 15 to 18 years.

The National Academy of Sciences' Food and Nutrition Board, however, is in the process of replacing these RDA with new dietary recommendations: Dietary Reference Intakes (DRI).<sup>2</sup> DRI were released recently for calcium, phosphorus, magnesium, fluoride, vitamin D, thiamin, riboflavin, niacin, vitamin B<sub>6</sub>, folate, vitamin B<sub>12</sub>, pantothenic acid, biotin, and choline (31,32). Reference intake values were published for the following age groups: 1 to 3 years, 4 through 8 years, 9 through 13 years, and 14 through 18 years.

The current RDA (or AI for calcium, fluoride, vitamin D, pantothenic acid, biotin, and choline) for children were

- (a) extrapolated from infant or adult research results (vitamins A, K, C, B<sub>6</sub>, B<sub>12</sub>, riboflavin, niacin, folate, biotin, choline, pantothenic acid, selenium, iodine, and manganese),
- (b) based on growth and consumption data (energy, protein, iron, phosphorus, and potassium),
- (c) estimated based on weight (fluoride and vitamin E),

<sup>2</sup>The DRI, a set of up to four nutrient-based reference values, consist of the Estimated Average Requirement (EAR), Recommended Dietary Allowances (RDA), Adequate Intake (AI), and Tolerable Upper Intake Level (UL). The EAR refers to the daily intake value that is estimated to meet the nutrient requirement in half of the individuals in a given age-gender group. The RDA consist of the average daily intake level that is sufficient to meet the nutrient requirement of nearly all healthy individuals in the age-gender group, based on the EAR. The AI is the daily intake value that is estimated to meet the nutrient requirement of nearly all healthy individuals in the age-gender group and is used when an EAR is not available to calculate the RDA. The UL defines the highest level of nutrient intake that is likely to pose no risks of adverse health effects in almost all individuals in the general population.

- (d) based on studies on balance in children, but not necessarily with all the above age groups (thiamin, zinc, copper, sodium, calcium, and magnesium), or
- (e) estimated based on biochemical markers (vitamin D) (23,31,32).

Because the RDA/AI for children were largely extrapolated or calculated rather than determined directly from studies of children, there is no overriding reason for using the RDA age-gender cutoffs for a children's food guide. Information on children's dietary intakes, nutritional status, and dietary recommendations—as well as information on their attitudes, knowledge, and behavior—must also be considered when determining which groups of children are most in need of nutrition guidance.

## Nutrition Recommendations for Children

### Recommendations of the U.S. Government

A number of recommendations indicate what constitutes a healthful diet for children. The *Dietary Guidelines for Americans*, the basis of Federal nutrition policy (39), provide advice about food choices that promote health and prevent disease among healthy Americans 2 years old and older. The Guidelines advise Americans to eat a varied diet with plenty of grain products, vegetables, and fruits, while moderating their intakes of fat, saturated fat, cholesterol, sugars, salt and sodium, and alcoholic beverages. In addition to emphasizing the benefits of physical activity, the Guidelines provide some specific advice for children: they should be taught to eat grain products; vegetables and fruits; lowfat milk products or other calcium-rich foods; beans, lean meat, poultry, fish or other

---

protein-rich foods; and to participate in vigorous physical activity. The Guidelines caution that fat should not be restricted for children younger than age<sup>3</sup> 2, that major efforts to change a child's diet should be accompanied by monitoring of growth at regular intervals by a health professional, and that children should not consume alcoholic beverages. The Guidelines also recommend that children between the ages of 2 and 5 should gradually adopt a diet so that it contains no more than 30 percent of calories from fat by the time children are about 5 years old (39).

The report *Healthy People 2010* outlines a national strategy for improving significantly the health of Americans during the 2001 to 2010 decade (42). Included in the 2010 report is a recommendation to reduce fat intake to an average of 30 percent of calories or less and saturated fat intake to an average of less than 10 percent of calories among people 2 years old and older. The National Cholesterol Education Program recommends that total fat intake averages **no more than** 30 percent of calories (24). These recommendations are consistent with the advice given in the 1990 Dietary Guidelines; the 1995 Dietary Guidelines amended this advice, stating that children between the ages of 2 and 5 should gradually reduce their total fat intake so that by age 5, they are consuming no more than 30 percent of calories from fat.

### **Recommendations of Other Organizations**

Several organizations provide dietary advice for children that is consistent with the basic principles of the *Dietary Guidelines for Americans*. The American

Academy of Pediatrics, for example, recommends that children eat a wide variety of foods and consume enough calories to support growth and development and to reach or maintain advisable body weight. The Academy also recommends that children over the age of 2 consume, on average, 30 percent of total calories from fat, less than 10 percent of calories from saturated fat, and less than 300 mg of cholesterol per day. However, the Academy cautions that "recommendations that call for 'less than' 30 percent of calories from fat may lead to the inappropriate use of more restrictive diets" (3).

The American Heart Association (AHA) concurs with the recommendation of the Dietary Guidelines that children between the ages of 2 and 5 gradually adopt a diet containing 30 percent or less of calories from fat. The AHA also agrees with the Dietary Guidelines' recommendation that diets of young children should maintain the primary emphasis on providing adequate calories and nutrients for normal physical activity, growth, and development (17).

Some disagree about the age at which children should adopt a lower fat diet. A joint working group of the Canadian Paediatric Society and Health Canada recommended a longer transition period to a diet lower in fat, compared with that recommended by the Dietary Guidelines. The joint working group advised that the transition from the high-fat diet during infancy (about 50 percent of calories from fat) to a diet that includes no more than 30 percent of calories as fat and 10 percent of calories as saturated fat take place between the age of 2 and the end of linear growth (about age 14 for females and 15 for males) (14). The rationale for the working group's recommendation was based on (1) lack of

**Other studies have also concluded that it is safe to recommend that fat intake be limited to 30 percent of calories and saturated fat intake to less than 10 percent of calories for children 5 years old and older . . . .**

<sup>3</sup>In this paper, the use of the terms "age" and "ages" refers to age in years, unless stated otherwise.

evidence that consuming a diet providing 30 percent of calories as fat and 10 percent of calories as saturated fat would either reduce illness in later life or provide short-term health benefits and (2) concerns that some children consuming a diet with low fat intakes have lower energy intakes and low intakes of some nutrients.

To support their position, the Canadian Paediatric Society and Health Canada cited a publication from the Bogalusa Heart Study in which 24-hour recalls were obtained from about 870 10-year-olds whose diets were stratified by fat intake: those with less than 30 percent of calories from fat had lower intakes of many nutrients than did children with higher fat intakes. The children with the lower percentage of calories from fat also had higher intakes of simple carbohydrates (25). The children enrolled in the Bogalusa Study had not been exposed previously to any dietary intervention programs. Therefore, it cannot be concluded, on the basis of the Bogalusa Study, that children—whose parents and caregivers have been instructed on how to moderate dietary fat intake—will be unable to meet their nutrient requirements on a diet containing 30 percent of calories from fat.

Other researchers have concluded that children can safely follow diets containing 30 percent of calories from fat. The Dietary Intervention Study in Children (DISC) is an ongoing, randomized study that is a controlled clinical trial of diets containing lowered fat, saturated fat, and cholesterol. About 660 children ages 8 to 10 who were enrolled in 6 centers, located around the country, were assigned randomly to either control groups or groups receiving behavioral intervention to promote their following a diet providing 28 percent of calories

from total fat, less than 8 percent of calories from saturated fat, and less than 150 mg of cholesterol (less than 75 mg/1,000 calories) per day. After 3 years, dietary levels of total fat, saturated fat, and cholesterol and blood levels of low-density lipoprotein cholesterol (LDL-C) decreased significantly in the intervention group, compared with the control group. The two groups, however, did not differ significantly on measures of growth and development: Height, red-blood-cell folate values, serum zinc, retinol and albumin levels, sexual maturation, and psychosocial health.

The DISC study found that children grew and developed normally after being instructed on consuming a lower fat diet. The children in the intervention group also had lower LDL-C levels than the controls. The researchers concluded, therefore, that the diet was effective as well as safe (19). Other studies have also concluded that it is safe to recommend that fat intake be limited to 30 percent of calories and saturated fat intake to less than 10 percent of calories for children 5 years old and older (26,29,35).

Another recommendation regarding children's diets addresses their requirements for dietary fiber. The Dietary Guidelines recommend that individuals 2 years and older choose a diet with plenty of grain products, vegetables, and fruits to provide adequate fiber. But the Guidelines do not set specific numerical goals for fiber intake. The American Health Foundation published a recommendation that a child's fiber intake be equivalent to his or her age plus 5 grams (g) a day ("age + 5"), with the recommendation ranging from 8 g a day for a child age 3 to 25 g a day for a person age 20 (44).

## Nutritional Status of Children

### Dietary Intake—Energy

Data on children's food consumption are provided by several national surveys: DHHS's National Health and Nutrition Examination Survey (NHANES III), USDA's Continuing Survey of Food Intakes by Individuals (CSFII), and the Market Research Corporation of America (MRCA) (1,10,16,37). Median energy intakes below 100 percent of the RDA for several age-gender groups were reported in NHANES III results (10). The CSFII 1994-96 reported that over half of the children 5 years old and younger had energy intakes below the RDA, and about 20 percent had energy intakes below 75 percent of the RDA. About 60 percent of males and 75 percent of females 6 to 19 years old had energy intakes below the RDA (37).

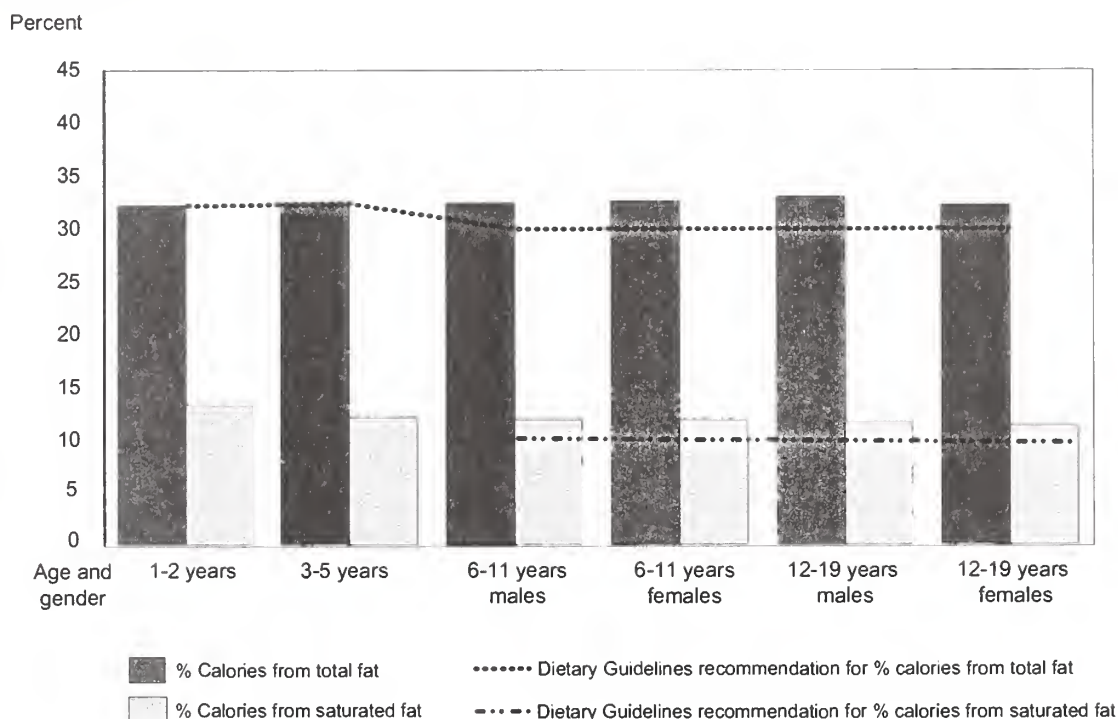
Rather than a reflection of actual low intakes of energy by children, these low intakes of energy could be the result of underreporting the foods eaten or of low energy expenditures by children. Several studies have reported that preschool-age children have energy expenditures lower than the RDA (6,11,12). In contrast, the prevalence of overweight among children has been increasing (36). According to CSFII 1994-96, about 5 to 10 percent of all children have energy intakes at or above 150 percent of the RDA (37).

### Dietary Intake—Macronutrients and Fiber

Food consumption surveys report that, on average, children are consuming more than 30 percent of calories from total fat and more than 10 percent of calories from saturated fat (fig. 1) (1,10,16,37). Kennedy and Goldberg, using CSFII 1989-91 data, reported that over three-fourths of all children exceeded



**Figure 1. Percent of calories from total fat and saturated fat in children's diets exceeds recommendations**



recommendations for total fat and saturated fat (15). Improvement was slight by 1994, when roughly two-thirds of all children exceeded the recommendation for total fat and saturated fat (16). Because of the Guidelines' recommendation for gradual adoption of a diet low in fat, concern is greater for children 5 years and older than it is for children 2 to 5 years old. The CSFII 1994-96 also reported that adolescent males are consuming more than 300 mg/day of cholesterol, the upper limit of cholesterol intake listed on the Nutrition Facts label (37).

Other studies have confirmed the findings regarding children's fat intake: most are consuming more than the recommended levels. About ninety 3- to 5-year-old children enrolled in the Framingham

Children's Study<sup>4</sup> consumed an average of 33 percent of calories from fat (28). Albertson and Tobelmann, analyzing 1986-88 MRCA data, reported that among 825 children ages 7 to 12, those who frequently ate ready-to-eat cereal (7 or more times in 14 days) consumed a lower percentage of calories from fat, compared with others who consumed ready-to-eat cereals less frequently: 2 to 6 times in 14 days or less than 2 times in 14 days. However, all three groups consumed more than 30 percent of calories from fat (2).

Data from the CSFII 1994-96 showed that young children's mean intakes of

<sup>4</sup>The longitudinal Framingham Children's Study examined factors related to the development of dietary habits and patterns of physical activity during childhood.

dietary fiber met the "age + 5" recommendation of the American Health Foundation. Children 5 years old and younger had mean fiber intakes of about 11 g a day. However, older children began to fall short of the fiber recommendations: males and females 6 to 11 years old consumed about 14 g and 12 g of fiber per day, respectively; their counterparts 12 to 19 years old consumed about 17 g (males) and 13 g (females) per day (37).

#### **Dietary Intake—Micronutrients**

American children are more likely to get adequate amounts of vitamins and minerals than they are to meet Dietary Guideline recommendations for total fat and saturated fat intake. However, some nutrients are consumed at levels below recommended amounts by some groups

in the U.S. population. For example, vitamin E and zinc are consumed at levels below 100 percent of the RDA by most children 2 to 19 years old (37). According to CSFII 1994-96, on the days surveyed, only about 60 percent of children 5 years and younger, 60 percent of females 6 to 11 years old, and only 28 percent of females 12 to 19 years old consumed 100 percent or more of the RDA for iron. Only about one-third each of males and females 12 to 19 years old consumed 100 percent or more of the RDA for vitamin A (37).

Calcium is another nutrient that children consume at levels below recommendations. Average calcium consumption is below the 1989 RDA for children 12 to 19 years old (fig. 2). In 1994-96, about half of the children 11 years old and younger consumed 100 percent or more of the 1989 RDA for calcium; just over one-third of males 12 to 19 years old and about 15 percent of females 12 to 19 years old consumed 100 percent or more of the calcium RDA (37). Even fewer children ages 9 and older would meet the new Adequate Intake for calcium, which increased to 1,300 mg (31).

Compared with other children, adolescents, particularly adolescent females, had the greatest problems in meeting their nutrient requirements. Adolescent females reported the lowest energy intakes in proportion to their energy requirement (37). Findings of MRCA data from 1991-94 show that most adolescents ages 11 to 17 consumed less than 2 servings (the minimal number recommended) of fruits a day. Twelve percent of adolescents consumed no fruits in a given day (45). Krebs-Smith et al. examined 3-day data from CSFII 1989-91 for children and adolescents 2 to 18 years old. Even after foods were separated into their

component ingredients (e.g., credit is given for vegetables in mixed dishes, such as on pizza or in sandwiches), only one in five children consumed the recommended 5 servings of fruits and vegetables a day. One-quarter of all vegetables that were consumed were French fries. Children from families with higher income consumed more servings of fruits and vegetables, compared with children from families with lower income (18).

Data from the CSFII 1994-96 also showed that children's intake of fruits and vegetables was low. Only about one-fourth of children 2 to 11 years old consumed the minimal 3 servings of vegetables a day that are recommended by the Pyramid, and only about 40 percent of females and 55 percent of males 12 to 19 years old met the minimal number of servings. About half of all 2- to 5-year-olds consumed the minimal 2 servings of fruit a day recommended by the Pyramid, but this dropped to about one-fourth for males and females 11 to 19 years old (37). Low intakes from one food group could explain some of the low nutrient intakes, particularly for vitamins A and C and folate.

Sodium intakes for many children are higher than 2,400 mg a day, its upper limit (listed on the Nutrition Facts label). Children 6 years old and older had median sodium intakes greater than 2,400 mg a day according to NHANES data (which includes allowances for salt added at the table and sodium in water and medications) (10). In the CSFII 1994-96 (which reports only sodium intake from food), the mean sodium consumption for all children 3 years old and older exceeded 2,400 mg a day. Mean sodium consumption for males ages 12 to 19 years was 4,407 mg a day (37).

### Anthropometric Indices

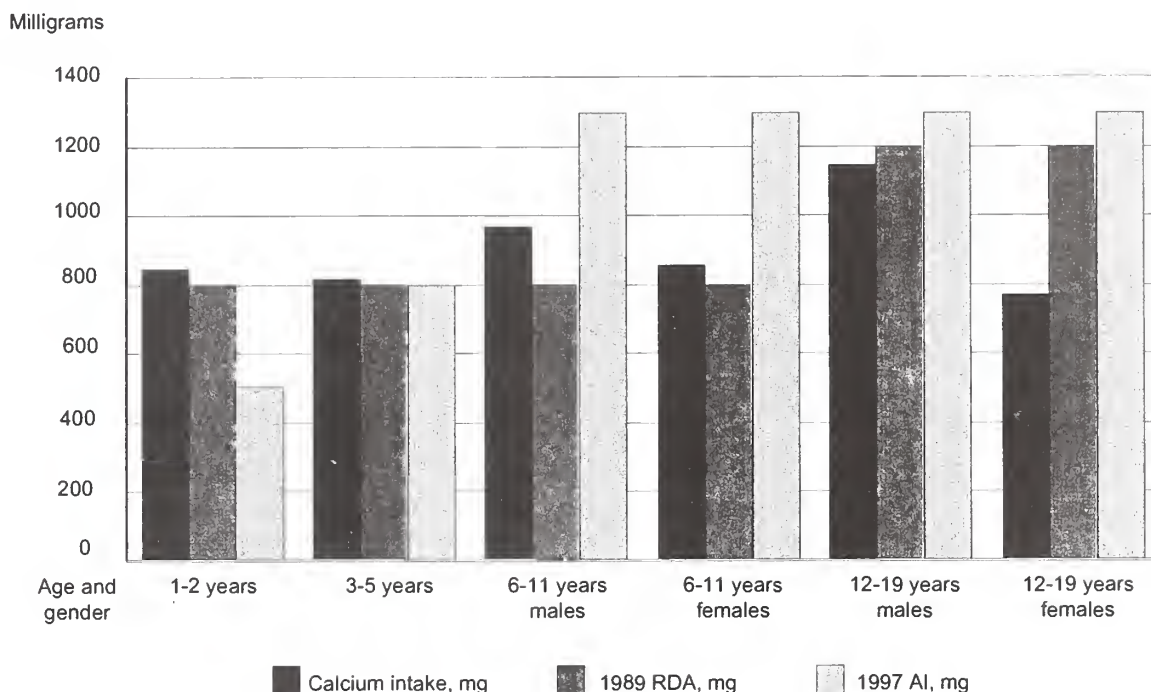
Weight and height indicators from NHANES III show that underweight is a concern for about 5 percent of 2- to 17-year-olds (only 2 percent of 12- to 17-year-old females) (10). Overweight, when defined as a weight for height greater than the 95th percentile, occurred in 10.9 percent of children ages 6 through 17 (36). When overweight was defined as a weight for height greater than the 85th percentile, the incidence of overweight increased to 22 percent (36). The prevalence of overweight increased between 1963-65 and 1988-91 among all age-gender groups, with the greatest increase occurring between 1976-80 and 1988-91 (36).

A study of the prevalence of overweight among preschool-age children 2 months through 5 years old found that overweight among 4- and 5-year-old females increased from 5.8 percent in 1971-74 to 10 percent in 1988-94. Overweight was defined, in this study of NHANES data, as being above the 95<sup>th</sup> percentile of the appropriate measures of the National Center for Health Statistics: weight-for-length or weight-for-stature growth curve. The prevalence of overweight did not increase among younger children. However, the increase in prevalence of overweight in children as young as 4 years old suggests that efforts to prevent overweight should begin in early childhood (27).

The increase in obesity is surprising, because many children are reporting energy intakes below the RDA. Lack of physical activity may be responsible for the increase, and the number of hours children watch television has been linked to obesity in this age group (8).



**Figure 2. Mean calcium intakes of older American children below recommended levels**



### Consumer Research— Children's Knowledge and Attitudes About Nutrition

When adapting a food guide for children, USDA staff believe it is useful to find out what children know about nutrition, what their attitudes are about foods and nutrition, and what nutrition education programs have been successful. Children have been the target audience for some qualitative and quantitative studies; however, information about their knowledge and attitudes regarding nutrition is far more scarce than information about adult's knowledge and attitudes.

#### Qualitative Studies

In late 1991, in preparation for developing nutrition labeling materials for children,

KIDSNET, Inc., an organization working on children's educational issues (in cooperation with the U.S. Food and Drug Administration [FDA]), sponsored mini-focus groups (3 children in each group) with children 6, 8, and 12 years old. The focus groups were designed to examine children's attitudes and behavior regarding food, as well as their awareness and knowledge of the relationship between nutrition and food. Six focus groups (with a mixture of racial and income groups) were conducted in the Washington, DC, area. The children reported having some influence over the foods they eat, particularly breakfast cereals, snack foods, and lunches. Some 6-year-olds even reported making their own lunches.

Results from the mini-focus group showed that the children's age influenced their knowledge of nutrition. Twelve-year-old children could name food groups and were aware that carbohydrate, protein, fat, vitamins, and minerals are found in food. Younger children did not have a clear understanding of food groups, and many children thought of vitamins as products that come in a bottle from the drugstore. However, even though the 12-year-old children were fairly knowledgeable about nutrition, their knowledge did not carry over to their own dietary patterns. Taste, instead, was their primary consideration in making food choices. In the words of one 12-year-old participant: "We hear 'Eat right. Don't do drugs.' It's getting boring, like a broken record, so we just tune it out" (30).

**... the increase in prevalence of overweight in children as young as 4 years old suggests that efforts to prevent overweight should begin in early childhood . . . .**

The FDA sponsored two focus groups, each consisting of six to eight females 13 to 15 years old from various racial and ethnic groups. The purpose of the focus groups was to determine the types of nutrition messages the participants would find compelling and to determine which format(s)—for messages about calcium—the participants would most likely pay attention to. These focus groups were held in the Washington, DC/Baltimore, MD, metropolitan area.

The results revealed that the participants had a fairly good knowledge of nutrition; they could name nutrients and make associations between a nutrient and its function, for example, “calcium makes your bones strong.” Participants said they tended to pay more attention to eating a healthful diet when they were actively involved in a sport. (Most were active in at least one sport.) A frequently mentioned barrier to healthful eating was related to school lunches: lunch periods were often rushed and at odd hours of the day. Participants expressed a preference for educational materials that contained bold, bright colors and little or no text (21).

The International Food Information Council sponsored one focus group with 9- to 12-year-old children and another with 13- and 14-year-olds to evaluate a prototype nutrition brochure. All of the participants had seen the Food Guide Pyramid, and all said they already knew about the importance of eating vegetables, fruits, and grain products. The participants, however, believed these concepts were “boring, because everyone knows that,” and they believed that information about eating breakfast, smart snacking, and balance was important. They also thought information about physical activity was important but believed that activities portrayed should be relevant

to their age group. Activities such as golf and racquetball were perceived as “adult” sports (9).

Because these studies were conducted using locally available samples and were conducted in urban areas, the results must be interpreted cautiously and cannot be generalized to all children.

### **Quantitative Studies**

The Kellogg Company surveyed children about their nutrition knowledge, attitudes, and behavior. A nationally representative school-based survey was conducted in 1988-89 with 5,000 students in Grades 3 through 12. Over half of the respondents in this survey believed nutrition is “very important”; however, nutrition was considered less important by older children than by younger ones. Almost three-quarters of elementary school students considered nutrition “very important,” compared with about half of junior high school students and only about one-third of high school students (13).

The Kellogg survey also found that the positive attitudes of many children did not always translate into appropriate behavior, confirming the results of the qualitative studies referred to earlier in this paper. Only about one-third of all school-age children responded “often” (rather than “sometimes” or “rarely”) to the statement “I eat the right foods.” Children who agreed strongly with the statement that too much cholesterol and saturated fat are bad for health reported eating foods high in these components as often as did other children, thus demonstrating that their knowledge did not change their behavior. The authors of the Kellogg survey suggested that lack of *sufficient* knowledge could be partially responsible for this disconnect—the children might know that excessive

---

dietary cholesterol and saturated fat are unhealthful, but they may not know which foods are rich sources of these components (13).

Lack of adult supervision could also account for some of the poor eating habits reported by the participants of the Kellogg survey. About 60 percent of children reported coming home to an empty house at least once a week, with more than one-third coming home alone three or more times a week. These "latchkey" children were more likely to report that they, rather than their parents, have more control over what they eat (60 percent of "latchkey" children; 35 percent of all elementary schoolchildren).

Eating away from home frequently could influence children's diets. According to USDA's CSFII 1994-96, about 40 percent of children 5 years old and younger and over two-thirds of children 6 to 19 years old reported eating at least one food item away from home on the day of the survey. The most frequently mentioned sources of food away from home were fast-food restaurants, school or day care, someone else or gift, and stores (37).

The Kellogg Survey also found that almost one-third of school-age children believed they were overweight (13). This figure is somewhat higher than the 22 percent of children 6 to 17 years old who were found to be overweight by NHANES III. This difference raises a possibility: some children whose weight is normal think they are overweight. Thus dieting is a common behavior among children; about 40 percent of all school-age children participating in the Kellogg Survey reported having been on a diet. More females than males reported dieting, and most of the children

who reported dieting did so for cosmetic reasons rather than for health (13).

Lack of physical activity has been cited as a possible reason for the increase in the percentage of children who are overweight (6,8,11,12). The Kellogg Survey, on the other hand, found that schoolchildren do consider exercise to be important. Elementary schoolchildren reported taking part in physical activity over five times a week; high school students reported being involved in physical activity about four times a week (13).

The Youth Risk Behavior Survey, a component of the Youth Risk Behavior Surveillance System (Centers for Disease Control and Prevention), is a national school-based survey of students in Grades 9 through 12. It contains a series of questions, parts of which are nutrition- or diet-related. Male students responding to this survey were significantly more likely than female students to consider themselves the "right weight" or "underweight" (86 vs. 66 percent). Female students were significantly more likely than male students to report trying to lose weight at the time of the survey (44 vs. 15 percent). Over one-fourth of female students who considered themselves the "right weight" reported trying to lose weight. And female students were significantly more likely than their male counterparts to report either currently or ever having used inappropriate practices to lose weight: such as, skipping meals, taking diet pills, or inducing vomiting (40).

The Youth Risk Behavior Survey asked students in Grades 9 through 12 how often they participated in vigorous activity in the 2 weeks preceding the survey. Vigorous activity was defined as "at least 20 minutes of hard exercise that made you

breathe heavily and made your heart beat fast" (41). About one-third of all students reported being vigorously active three or more times a week, but female students were half as likely than male students to report regular vigorous activity (25 vs. 50 percent), and African American students were less likely than White or Hispanic students to report regular vigorous activity (30 vs. 40 and 35 percent, respectively) (41).

### **Studies of Nutrition Education Programs—What Works**

USDA conducted research to evaluate adults' comprehension and perceived usefulness of its food guide and to develop a graphic presentation of the food guide (43). USDA also conducted research to determine the effectiveness of the resulting graphic of the Food Guide Pyramid with three target audiences: children, consumers with less than a high school education, and low-income consumers. USDA, in 1991, collaborated with DHHS and contracted with private industry (4) to develop and test graphic alternatives (including a bowl, shopping cart, and dinner plate) to the Food Guide Pyramid for conveying the key concepts of variety, proportionality, and moderation.

Qualitative findings indicated that children preferred the Pyramid graphic to the alternatives tested. They, as well, learned the most information from the Pyramid. Teachers also preferred the Pyramid as a teaching tool, compared with the alternatives (4). For the quantitative phase of the research, interviewers questioned 3,017 individuals, including 1,523 children in Grades 2 through 10. The children's responses to the 60-item questionnaire indicated that the Pyramid graphic conveyed the concepts of variety, proportionality, and moderation. Younger children (Grades 2 to 3),



---

**The Center selected the preschool-age group (2 to 6 years) as the target audience for an adapted food guide . . . .**

however, understood variety more so than proportionality and moderation (4).

### **Effectiveness of Nutrition Education Programs**

The Food Guide Pyramid adapted for children needed to integrate relevant findings from a recent comprehensive review on the effectiveness of methods used in nutrition education. This review revealed that programs using educational methods directed at behavioral change as a goal were more likely than other programs to be successful—that is, they were more likely to result in some behavioral change than were programs that focused on only distributing information (5).

Contento et al. recommended that programs be behaviorally based and appropriately designed for the child's stage of cognitive development (5). Preschool and early elementary school-age children (4 to 7 years) need activities that allow them to modify their environment. Providing food-based activities and having adults model eating behavior are appropriate for this age group. Also, parents' or other caregivers' involvement with children in this age group is an important factor contributing to success. Older elementary school-age children (8 through about 11 years) still need to have information presented in concrete terms. Food-classification activities and modeling by adults are appropriate for this age group, and involvement with parents and the community is still important for programs targeted for this age group.

Adolescents (second decade of life) move from concrete to abstract thinking and are able to comprehend more abstract information, such as the relationship between diet and health—present and

future. They need activities that encourage critical thinking, such as exploring the influence of diet on health and the environment. With this age group, parents' involvement becomes less important, because adolescents are more likely to be influenced by their peers than by their parents or caregivers (5).

The quantity and quality of existing nutrition education materials for specific age groups of children must also be considered when selecting a target audience. Recently, Swadener reviewed research related to nutrition education for preschool-age children (33), and Lytle reviewed research related to nutrition education for school-age children (20). Both found that while many nutrition education materials are directed toward children, improvements and follow-up are needed to determine whether the materials are really effective.

Swadener found that many nutrition education materials developed for preschoolchildren did not include an evaluation component, many programs were not conducted for a sufficient time to result in changes in attitudes or behavior, and few programs were designed for use with children from dysfunctional or marginally functional families. Lytle concluded that more tools are needed for assessment of change in children's and adolescents' eating behavior and that adolescents, in particular, could benefit from exposure to strategies that modify behavior. Lytle also found that more programs are needed: ones that target multi-ethnic groups as well as involve families of school-age children.

---

## Pros and cons of adapting the Food Guide Pyramid for use with three groups of children

---

Pros	Cons
<b><i>Preschool age (2 through 6 years)</i></b>	
Have special needs, re: fat, smaller serving sizes	Educational materials must target parents and caregivers, not child directly
Peer pressure not a problem	Fat message (children this age need more fat) may confuse parents, because this need is temporary
Can reach them through the Special Supplemental Feeding Program for Women, Infants, and Children and the Child and Adult Care Feeding Program	
Developmentally a good time to reach (e.g., when food habits are still being formed)	
Can counteract exposure to television advertising of high-calorie foods	
Not as many materials targeting this age group as for older children	
<b><i>Elementary school age (7 through 11 years)</i></b>	
Think nutrition is important but don't act on it; they are "reachable"	Already a large amount of nutrition education material available for this audience (however, not all of it is relevant or appropriate)
Beginning to take more responsibility for their own food choices	Current food guide already meets nutrient needs
Easier to reach (through a single classroom teacher) than younger or older children (where nutrition education may be provided by a diverse group of individuals)	
<b><i>Adolescents (12 to 18 years)</i></b>	
More problems meeting nutrient needs	Current food guide already meets nutrient needs
Not many materials targeting this audience	Difficult audience to reach—need different ways to communicate food guide, not necessarily different food guide
Make many of own food choices	Need more individualized messages—e.g., for athletes vs. nonathletes
Perhaps can turn weight concerns into motivation for change	

---

---

## Decision Point—Target Audience for the Food Guide Pyramid for Children

Because of differences in nutrient needs (23,31,32), current food consumption patterns (10,16,37), and stages of educational development (5), a single food guide cannot meet the needs of all children 2 to 18 years old. Based on children's nutrient needs and developmental level, staff of the Center for Nutrition Policy and Promotion identified three age groups for which a Pyramid could be developed:

- Preschool and early elementary age (2 through 6 years)
- Elementary school age (7 through 11 years)
- Middle and high school age (12 to 18 years)

The Center staff considered several factors when deciding which age group should be targeted for an adapted food guide:

- Does the existing food guide meet this group's dietary needs, or does this group have specific nutritional and health problems that an adapted food guide could help to address?
- If the existing food guide meets the group's dietary needs, has it been successful in influencing the group's behavior? Is there a need for an alternate presentation of the existing food guide to better reach this group?
- What nutrition education materials exist for this audience?
- What are the educational considerations for this group? Will children be able to use the new food guide directly? Will they use the materials with guidance from a parent or caregiver? Or will the materials be developed for the parent or caregiver?

- Is there user demand for a new food guide for this group?
- What is the social effect of the decision? Will different food guides for different ages create confusion?

Based on these factors, Center staff listed pros and cons for developing an adapted food guide for each age group (table) and considered these issues when making the decision regarding the target audience.

### Implications and Recommendations for a Food Guide for Preschool-Age Children (2 to 6 Years)

The Center selected the preschool-age group (2 to 6 years) as the target audience for an adapted food guide because there is a greater need for verifying the scientific basis of the food guide, both from a physiological and developmental viewpoint for 2- to 6-year-olds than for older children. The rationale for this conclusion follows:

- Nutrient needs of preschool-age children differ from those of older children. The *Dietary Guidelines for Americans* recommend that the level of dietary fat be gradually decreased from current levels (about 34 percent of calories from fat) to 30 percent of calories by the time the child is about 5 years old (39). Concerns about undue food and fat restrictions for children in this age group, leading to "failure to thrive," have been expressed by the American Academy of Pediatrics (3). Because the current Food Guide Pyramid assumes a dietary fat intake of 30 percent of calories, Center staff concluded that additional guidance is needed for parents and caregivers of children less than 5 years old.

- Following the release of the Food Guide Pyramid, USDA received numerous questions from the Extension Service; the Dairy Council; the Special Supplemental Food Program for Women, Infants, and Children (WIC); the Child and Adult Care Food Program; and the media. The concern: how to use the food guide with young children, particularly regarding children's need for smaller serving sizes.
- Developmental concerns regarding food activities at the preschool level include determining what young children can or should "learn" and addressing the physiological and emotional issues related to food. Because parents and caregivers have a major role in food selection for this age group, Center staff believed these children's attitudes and behavior must also be considered.

Adaptation of the food guide for this age group uses the same framework of food groups as the original food guide. Thus the framework blends into later learning activities in school where concepts are added, for example, nutrient content of different types of foods; how foods are grown, processed, and delivered; how different food items are used in different cultures; and how "new" foods have been historically introduced into the American diet. Using the same framework of food groups also makes the new food guide more practical for family food managers to use. The process used to adapt the food guide for the preschool and early elementary-age audience is described elsewhere in this issue (22,34).

---

## References

1. Albertson, A.M., Tobelmann, R.C., and Engstrom, A. 1992. Nutrient intakes of 2- to 10-year-old American children: 10-year trends. *Journal of the American Dietetic Association* 92:1492-1496.
2. Albertson, A.M. and Tobelmann, R.C. 1993. Impact of ready-to-eat cereal consumption on the diets of children 7-12 years old. *Cereal Foods World* 38(6):428-431.
3. American Academy of Pediatrics, Committee on Nutrition. 1998. Statement on cholesterol. *Pediatrics* 101:141-147.
4. Bell Associates, Inc. 1992. *An Evaluation of Dietary Guidance Graphic Alternatives*. Prepared for U.S. Department of Agriculture, Food and Consumer Services.
5. Contento, I., Balch, G.I., Bronner, Y.L., Paige, D.M., Gross, S.M., Bisignani, L., Lytle, L.A., Maloney, S.K., White, S.L., Olson, C.M., Swadener, S.S., and Randell, J.S. 1995. The effectiveness of nutrition education and implications for nutrition education policy, programs, and research: A review of research. *Journal of Nutrition Education* 27(6):277-422.
6. Davies, P.S.W., Gregory, J., and White, A. 1995. Energy expenditure in children aged 1.5 to 4.5 years: A comparison with current recommendations for energy intake. *European Journal of Clinical Nutrition* 49:360-364.
7. Dietary Guidelines Advisory Committee. 1995. *Report of the Dietary Guidelines Advisory Committee on the Dietary Guidelines for Americans*. U.S. Department of Agriculture, Agricultural Research Service.
8. Dietz, W.H. Jr. and Gortmaker, S.L. 1985. Do we fatten our children at the television set? Obesity and television viewing in children and adolescents. *Pediatrics* 75:807-812.
9. Edelman Public Relations Worldwide. 1995. *Report of Focus Groups at Stevens Elementary and Poe Middle School*. Topline report submitted to International Food Information Council.
10. Federation of American Societies for Experimental Biology, Life Sciences Research Office. Prepared for the Interagency Board for Nutrition Monitoring and Related Research. 1995. *Third Report on Nutrition Monitoring in the United States: Volume 1*. U.S. Government Printing Office, Washington, DC, 365 pp.
11. Fontvielle, A.M., Harper, I.T., Ferraro, R.T., Spraul, M., and Ravussin, E. 1993. Daily energy expenditure by five-year-old children, measured by doubly labeled water. *Journal of Pediatrics* 123:200-207.
12. Goran, M.I., Carpenter, W.H., and Poehlman, E.T. 1993. Total energy expenditure in 4- to 6-year-old children. *American Journal of Physiology* 264:E706-E711.
13. Harris/Scholastic Research. 1989. *The Kellogg Children's Nutrition Survey*. Conducted for the Kellogg Company, Battle Creek, Michigan.
14. Joint Working Group of the Canadian Paediatric Society and Health Canada. 1993. *Nutrition Recommendations Update . . . Dietary Fat and Children*. Ottawa, Ontario: Health Canada, Cat. H39-162/1-1993E. 18 pp.
15. Kennedy, E. and Goldberg, J. 1995. What are American children eating? Implications for public policy. *Nutrition Reviews* 53(5):111-126.



- 
16. Kennedy, E. and Powell, R. 1997. Changing eating patterns of American children: A view from 1996. *Journal of the American College of Nutrition* 16(6):524-529.
17. Krauss, R.K., Deckelbaum, R.J., Ernst, N., Fisher, E., Howard, B.V., Knopp, R.H., Kotchen, T., Lichtenstein, A.H., McGill, H.C., Pearson, T.A., Prewitt, T.E., Stone, N.J., Van Horn, L., and Weinberg, R. 1996. Dietary Guidelines for healthy American adults: A statement for health professionals from the Nutrition Committee, American Heart Association. *Circulation* 94:1795-1800.
18. Krebs-Smith, S.M., Cook, A., Subar, A.F., Cleveland, L., Friday, J., and Kahle, L.L. 1996. Fruit & vegetable intakes of children and adolescents in the United States. *Archives of Pediatric and Adolescent Medicine* 150:81-86.
19. Lauer, R.M., Obarzanek, E., Kwiterovich, P.O., Kimm, S.Y.S., Hunsburger, S.A., Barton, B.A., van Horn, B., Stevens, V.J., Lasser, N.L., Robson, A.M., Franklin, F.A., and Simons-Morton, D.G. 1996. Efficacy and safety of lowering dietary intake of fat and cholesterol in children with elevated low-density lipoprotein cholesterol: The Dietary Intervention Study in Children (DISC). *Journal of the American Medical Association* 273:1429-1435.
20. Lytle, L.A. 1994. *Nutrition Education for School-Aged Children: A Review of Research*. Report prepared for U.S. Department of Agriculture, Food and Consumer Service.
21. Macro International. 1995. *Adolescent Consumers' Attitudes Toward Calcium Education and Proposed Educational Materials: Focus Groups Report*. Prepared for the U.S. Food and Drug Administration.
22. Marcoe, K.L. 1999. Technical research for the Food Guide Pyramid for Young Children. *Family Economics and Nutrition Review* 12(3&4):18-32.
23. National Academy of Sciences, National Research Council, Food and Nutrition Board. 1989. *Recommended Dietary Allowances* (10th ed.). National Academy Press, Washington, DC.
24. National Cholesterol Education Program. 1991. *Report of the Expert Panel on Blood Cholesterol Levels in Children and Adolescents*. Bethesda, MD: National Institutes of Health, NIH Publication no. 91-2732. 119 pp.
25. Nicklas, T.A., Webber, L.S., Koschak, M.L., and Berenson, G.S. 1992. Nutrient adequacy of low fat intakes for children: The Bogalusa Heart Study. *Pediatrics* 89(2):221-228.
26. Niinikoski, H., Lapinleimu, H., Viikari, J., Ronnema, T., Jokinen, E., Seppanen, R., Terho, P., Tuominen, J., Valimaki, I., and Simell, O. 1997. Growth until 3 years of age in a prospective, randomized trial of a diet with reduced saturated fat and cholesterol. *Pediatrics* 99(5):687-694.
27. Odgen, C.L., Troiano, R.P., Briefel, R.R., Kuczmarski, R.J., Flegal, K.M., and Johnson, C.L. 1997. Prevalence of overweight among preschool children in the United States, 1971 through 1994. *Pediatrics* 99(4):e1.
28. Oliveria, S.A., Ellison, R.C., Moore, L.L., Gillman, M.W., Garrahe, E.J., and Singer, M.R. 1992. Parent-child relationships in nutrient intake: The Framingham Children's Study. *American Journal of Clinical Nutrition* 56:593-598.
29. Shea, S., Basch, C.E., Stein, A.D., Contento, I.R., Irigoyen, M., and Zybert, P. 1993. Is there a relationship between dietary fat and stature or growth in children three to five years of age? *Pediatrics* 92(4):579-586.



- 
30. Shugoll Research. 1992. Children's Nutrition Label Focus Group Study. Report prepared for KIDSNET, Inc., Washington, DC.
31. Standing Committee on the Scientific Evaluation of Dietary Reference Intakes, Food and Nutrition Board, Institute of Medicine. 1997. *Dietary Reference Intakes for Calcium, Phosphorus, Magnesium, Vitamin D, and Fluoride*. Washington, DC. National Academy Press.
32. Standing Committee on the Scientific Evaluation of Dietary Reference Intakes, Food and Nutrition Board, Institute of Medicine. 1998. *Dietary Reference Intakes for Folate, Other B Vitamins, and Choline*. Washington, DC. National Academy Press.
33. Swadener, S.S. 1994. *Nutrition Education for Preschool Children: A Review of Research*. Report prepared for U.S. Department of Agriculture, Food and Consumer Service.
34. Tarone, C. 1999. Focus group research on adapting the Food Guide Pyramid for Young Children. *Family Economics and Nutrition Review* 12(3&4):33-44.
35. Tonstad, S. and Sivertsen, M. 1997. Relation between dietary fat and energy and micro-nutrient intakes. *Archives of Diseases of Childhood* 76(5):416-442.
36. Troiano, R.P., Flegal, K.M., Kuczmarski, R.J., Campbell, S.M., and Johnson, C.L. 1995. Overweight prevalence and trends for children and adolescents: The National Health and Nutrition Examination Surveys, 1963 to 1991. *Archives of Pediatric and Adolescent Medicine* 149:1085-1091.
37. U.S. Department of Agriculture, Agricultural Research Service. 1998. *Food and Nutrient Intakes by Individuals in the United States by Sex and Age, 1994-96, Nationwide Food Surveys*. Report No. 96-2. 197 pp.
38. U.S. Department of Agriculture, Human Nutrition Information Service. 1992. *The Food Guide Pyramid*. Home and Garden Bulletin No. 252.
39. U.S. Department of Agriculture and U.S. Department of Health and Human Services. 1995. *Nutrition and Your Health: Dietary Guidelines for Americans* (4th ed.). U.S. Department of Agriculture. Home and Garden Bulletin No. 232.
40. U.S. Department of Health and Human Services. 1991. Body-weight perceptions and selected weight-management goals and practices of high school students—United States, 1990. *Morbidity and Mortality Weekly Reports* 40:741,747-750.
41. U.S. Department of Health and Human Services. 1992. Vigorous physical activity among high school students—United States, 1990. *Morbidity and Mortality Weekly Reports* 41:33-35.
42. U.S. Department of Health and Human Services. 2000. *Healthy People 2010* (Conference Edition in Two Volumes). Washington, DC.
43. Welsh, S.O., Davis, C., and Shaw, A. 1993. *USDA's Food Guide: Background and Development*. U.S. Department of Agriculture. HNIS Miscellaneous Publication No. 1514.
44. Williams, C.L. 1995. Importance of dietary fiber in childhood. *Journal of the American Dietetic Association* 95:1140-1146, 1149.
45. Zizza, C.A. and Powell, R. 1996. Characteristics distinguishing adolescents by fruit consumption. *Journal of the American Dietetic Association* 96:A-91.

# Technical Research for the Food Guide Pyramid for Young Children

Kristin L. Marcoe  
Center for Nutrition Policy  
and Promotion

This article describes the technical research for the Food Guide Pyramid for Young Children. Composites for food groups and subgroups were developed using food intake data for children 2 to 6 years old. Data were from the Continuing Survey of Food Intakes by Individuals 1989-91. The composites were used in creating 1,300- and 1,600-calorie Food Guide Pyramid diet patterns. For children 4 to 6 years old, the 1,600-calorie pattern met all nutrient requirements, except for vitamin E. The 1,300-calorie pattern provided the RDA for most nutrients for 2- to 3-year-olds and 4- to 6-year-olds. The major exceptions were iron and zinc for both age groups and copper and vitamin E for the 4- to 6-year-olds. When breakfast cereals fortified with iron and zinc were used in the grain composites, the patterns provided recommended levels of these nutrients. Children could improve their diet by making different food choices, in particular, by eating more dark-green and deep-yellow vegetables; legumes; whole grains; and lean meat, poultry, or fish.

**T**he Food Guide Pyramid for Young Children ages 2 to 6 years is a nutrition education tool to help teach healthful eating concepts to young children. The technical research conducted in developing and documenting the research base for this food guide followed procedures similar to those described in the development and documentation of the original food guide (1,9). Food selections and serving sizes reported for young children, in a national food consumption survey, were incorporated into diet patterns based on the Food Guide Pyramid to determine whether such patterns would meet nutritional goals.

A composite was developed for each Pyramid food group (e.g., meat, poultry,

fish) or subgroup (e.g., whole grain). Composites were based on children's actual food choices and reflected the relative use of individual foods within the group or subgroup. An example: the composite for deep-yellow vegetables reflected children's consumption of 89 percent as carrots and 11 percent as other deep-yellow vegetables. A nutrient profile was then calculated for each composite, after which composites and their nutrient profiles were used to calculate expected nutrient levels in 1,300- and 1,600-calorie diet patterns based on the Food Guide Pyramid. The nutrient totals were then analyzed to determine whether children's nutrient requirements could be met by diet patterns that conform to Pyramid recommendations and that consist of the foods most commonly eaten by children.

---

## Methods

### Data Sources

Data on 3-day food and nutrient intakes reported in the Continuing Survey of Food Intakes by Individuals (CSFII) 1989-91 for 1,053 children 2 to 6 years old were used in this study. This data set was used because when work was started, the data set offered the largest number of individuals and days for analysis. Sample weights were applied to provide estimates that were representative of the population. The data that were used to calculate the nutrient profiles of the composites for the food groups and subgroups came from the U.S. Department of Agriculture's (USDA) Nutrient Data Base for Individual Intake Surveys, Release 7 (1991).

The Food Guide Servings Data Base was used to report the amounts of food consumed as numbers of food guide servings. USDA's Center for Nutrition Policy and Promotion (CNPP) developed this data base by using the foods reported in the CSFII 1989-91. The Food Guide Servings Data Base consists of food-item descriptions and the number of Pyramid servings per 100 grams of food. Servings data are provided for the 5 major food groups and 21 subgroups identified in the Food Guide Pyramid.

Most foods, including mixed dishes, were broken down into ingredient components, and their food group servings were calculated for more than one food group. When a food code's typical serving size, defined in the Survey Code Book for CSFII 1989-91 and based generally on median serving sizes reported in USDA food consumption surveys, provided less than one-fourth of a serving of a Pyramid food group or subgroup, it was usually not

counted. For example, a serving of oatmeal raisin cookies provided less than one-fourth of a Pyramid serving of raisins, so those raisins were not counted toward fruit servings. These small amounts were not counted because one objective of the original food guidance system was "usability." It is unrealistic to expect Americans to "count" small amounts of some foods toward food group servings. However, if several "other vegetables" like tomatoes and onions were in small amounts in a mixture, and these amounts together added up to at least one-fourth serving, these "other vegetables" were counted toward vegetable servings.

### Procedures

CNPP began the research process by breaking down the foods that were consumed by children 2 to 6 years old, as reported in the CSFII 1989-91, into numbers of food group and subgroup servings. The Food Guide Servings Data Base was used for this process. To identify specific food components, CNPP staff reviewed food codes that contributed food guide servings.

All food items with similar food components were grouped in the same item-group. For example, broccoli soup and broccoli casserole both contained cooked broccoli and so were placed in the item-group for cooked broccoli within the subgroup for dark-green vegetables. A composite was then constructed by summing intakes from all the item-groups within a food group, with each item-group being weighted by the numbers of servings reported for children 2 to 6 years old. Then the percentage contributed by each item-group in the food group or subgroup was calculated. The total number of servings of cooked broccoli consumed, for example, was divided by the total number of servings of dark-green

vegetables consumed. This calculation produced the percentage of the composite for dark-green vegetables that was cooked broccoli. Any item-group totaling less than 1 percent of the composite was combined with another item-group, based on the similarity in nutrient composition or its use in meals.

A food code most representative of an item-group was then selected to represent each food-item group in each of the composites. The nutrient values of these food codes were used to calculate the nutrient profiles of the composites. In developing the original nutrient profiles for the food groups and subgroups, researchers included foods with the least amount of fat and without added sugars; thus, the original philosophical goal of flexibility for the food guide was met. The food guide was used to show consumers how to obtain nutrients while allowing them flexibility to choose sources of fat and added sugars within the fat and calorie limits specified (9). In addition, the Food Guide Pyramid is an educational tool to help put the Dietary Guidelines into practice (8).

To minimize fat, added sugars, and sodium, CNPP staff used the form of the food item that was lowest in these components. For example, the deep-yellow vegetable subgroup contained the item-group for sweet potatoes. To represent the latter in the composite, CNPP used the code for a baked sweet potato without added fat—despite the fact that children usually eat candied sweet potatoes. For most vegetable and cooked-grain item-groups, CNPP used food codes that specified "no salt added in preparation." In a few cases, CNPP used the salted form to represent popular vegetables that are canned. Estimates of the percentage selected

**... young children ate somewhat different types and amounts of food items within each food group and subgroup than did the total population.**

in canned form were calculated from data of the food supply (4).

Non-fortified ready-to-eat and cooked breakfast cereals were used in both the composites for whole grains and enriched grains. Hence nutrient profiles of the composites do not overestimate the nutrients for children who do not eat fortified breakfast cereals. Nutrients added at standard enrichment levels, as in enriched bread, were included in the nutrient profiles for the composites. Folate fortification was not mandated by the Government at the time the CSFII 1989-91 was conducted, so it was not reflected in any of the nutrient profiles for grain products.

Once CNPP chose the food code to represent each item-group, we calculated grams of the food code and corresponding nutrient values for its portion of the composite serving. Nutrient values were then summed across all items in the food group or subgroup to determine the composite's nutrient profile per serving.

Composites were not developed for the meat alternates (eggs, nuts and seeds) or for the milk, yogurt, and cheese group. The nutrient profiles of a food group or subgroup reflect proportionately the nutrient content of the foods within them; consequently, the nutrient profile of a food group or subgroup most reflects the nutrient content of the most frequently consumed foods within that group.

Nutrient profiles for the meat alternates were represented by the nutrients in one large boiled egg and 2 tablespoons of peanut butter, each of which counts as 1 ounce from the meat, poultry, fish group. Peanut butter was 90 percent of young children's servings of nuts and seeds in the CSFII 1989-91; thus, peanut

butter's nutrient profile was used instead of calculating a composite of all the different nuts and seeds that were consumed in small quantities by young children.

All legumes were counted as vegetables in the earlier research on Pyramid food patterns (1) and so were counted similarly in this research project. One-half cup of cooked legumes may be counted as 1 ounce of meat, poultry, or fish rather than 1 serving of vegetables.

The nutrient profile for the milk, yogurt, and cheese group was represented by 1 cup of nonfat milk, except for vitamin A. The amount of vitamin A used was the 76 RE per cup found in whole milk, instead of the 149 RE per cup found in fortified nonfat milk. Thus over-estimation of vitamin A was avoided for those who consumed non-fortified whole milk products.

The data on food intake, which were used to develop the composites, were examined to identify the most popular foods (at the food code level) and preparation styles in each item-group. Amounts reported eaten were also analyzed. For each item-group, the average number of servings per report was calculated. This was the average quantity of a specified food that was eaten by consumers during an eating occasion (at a single time). Then, the average number of servings per report was calculated for each food group or subgroup.

The food-group composites and nutrient profiles for young children were compared with another set of composites that were developed for all individuals ages 2 years and older who provided 3 days of data in the CSFII 1989-91 (N=11,488).



Composites and their nutrient profiles indicated that while children do eat somewhat differently from the rest of the population of all individuals ages 2 years and older, few substantial differences resulted in the expected nutrient profile of a composite serving of any of the food groups or subgroups.

Next, the composites and nutrient profiles were used in Food Guide Pyramid diet patterns that included added fat and added sugars. In these patterns, a fat composite was used to represent "discretionary" fat added to the diet above what would be found in lean meats and forms of the other composite foods that were lowest in fat. For example, the fat in cakes and the margarine spread on bread are discretionary fats. The nutrient profile for the fat composite was based on the percentages of different animal and vegetable fats in the food supply from 1989 to 1991 (7).

"Added sugars" are added to the diet when a person either chooses foods that contain added sugars as ingredients (e.g., cookies) or adds some form of sugar (e.g., pancake syrup) to foods at the table. The nutrient profile for added sugars was represented by the nutrients in 1 teaspoon of granulated sugar.

CNPP analyzed the Food Guide Pyramid diet patterns to determine whether young children's nutrient requirements would be met by a diet pattern set at a calorie level close to what children eat and based on their food choices within food groups. The nutritional objective for food energy was to be within the range of the Recommended Energy Intake (REI) for 2- to 6-year-olds. Protein, vitamins, and minerals were to meet the Recommended Dietary Allowances (RDA) for young children.

The objective for dietary fat for young children was that after age 2, children should gradually adopt a diet so that it contains no more than 30 percent of calories from fat by the time they are 5 years old (8). For this study, the fat level was to be the same as the CSFII 1989-91 level for 2- to 3-year-old children (34 percent of calories from fat) and was to decrease in older age groups to 30 percent of calories by age 5. The *Dietary Guidelines for Americans* also advise that saturated fat be less than 10 percent of calories (8). For 2- to 3-year-old children, saturated fat was targeted at the consumption level of 13.6 percent of calories, and for the older preschooler (5 to 6 years old), saturated fat was targeted at less than 10 percent of calories. Cholesterol was to average 300 milligrams or less per day (3).

Food Guide Pyramid diet patterns were to provide a minimum of "age (in years) plus 5" grams of dietary fiber, recommended by the American Health Foundation (10). The objective for sodium was that diet patterns were to provide 2,400 milligrams or less per day (3). Diet patterns could include added sugars in order to meet the targeted calorie levels of 1,300 or 1,600, after calories from servings of the food groups and added fats were totaled.

## Results

### Composites

Table 1 summarizes the food group and subgroup composites for young children and for all individuals ages 2 and older. For example, in the subgroup for dark-green vegetables, cooked broccoli was about 74 percent of the reported food guide servings of dark-green vegetables for young children; cooked broccoli was 52 percent of such servings for all individuals.

Table 2 lists the amounts of selected nutrients per serving of the composite for each food group and subgroup for the young child and for all individuals. Despite differences in food selection, as shown in the composites in table 1 and described later in this study, the differences in the nutrient profiles between the young child's and all individuals' composites were relatively minor. As expected, young children ate somewhat different types and amounts of food items within each food group and subgroup than did the total population.

### **Fruit.** *Children obtained much of their fruit servings in juice form.*

Young children consumed a large share of their fruit servings as juices—nearly 47 percent, compared with 35 percent for all individuals (table 1). The largest single component of children's fruit composite was orange juice (23 percent), followed by apple juice (20 percent).

Higher percentages of apple juice and grape juice in the composite for children than in the composite for all individuals contributed to the higher carbohydrate and calorie levels in children's nutrient profile for fruit (table 2). The smaller amount of orange juice in the children's fruit composite, compared with the composite for all individuals, was likely related to the lower potassium, vitamin C, and folate levels in the children's nutrient profile. The absence of cantaloupe in the children's composite was associated with a lower vitamin A value for the children's fruit composite, compared with that for all individuals.

Table 1. Food group composites for young children and all individuals<sup>1</sup>

Food group	Item-group	Child	All indiv.	Food group	Item-group	Child	All indiv.
<i>Percent</i>				<i>Percent</i>			
Fruit	Orange juice	22.9	24.3	Legume	Kidney beans	17.6	19.6
	Grapefruit juice	-	2.2		Chickpeas	-	1.6
	Apple juice	19.9	6.8		Soybeans	-	1.4
	Grape juice	<u>3.8</u>	<u>1.7</u>		White beans	30.8	26.9
	<b>Total juice</b>	<b>46.6</b>	<b>35.0</b>		Black beans	3.7	2.7
	Orange, raw	3.9	3.7		Pinto beans	34.7	32.2
	Grapefruit, raw	-	2.8		Lima beans	5.9	6.7
	Strawberries	2.1	4.2		Split peas	3.3	3.8
	Cantaloupe	-	3.0		Lentils	1.1	1.5
	Watermelon	4.4	4.4		Cowpeas	2.8	3.6
	Apple, raw	9.2	10.0	Starchy vegetable	Corn	18.2	13.5
	Banana	8.4	10.1		Potatoes, boiled	66.9	64.9
	Grapes	4.7	5.2		Potatoes, baked	6.7	12.8
	Peach, raw	1.8	3.9		Green peas	8.2	8.8
	Plums, raw	1.3	2.0	Other vegetable	Tomatoes, ck	40.1	25.5
	Raisins	<u>1.6</u>	<u>1.5</u>		Tomatoes, raw	8.1	11.3
	<b>Total raw</b>	<b>37.4</b>	<b>50.8</b>		Tomato juice	-	<u>1.4</u>
	Applesauce	7.1	3.2		<b>Total tomatoes</b>	<b>48.2</b>	<b>38.2</b>
	Apple, ck*	-	1.3		<b>Green beans, ck</b>	<b>19.1</b>	<b>10.9</b>
	Peach, ck, cnd*	5.3	5.5		Iceberg lettuce	11.6	21.6
	Pears, ck, cnd	1.5	2.0		Cucumber, raw	1.9	3.1
	Pineapple, ck, cnd	<u>2.0</u>	<u>2.4</u>		Onions, raw	-	1.8
	<b>Total canned</b>	<b>15.9</b>	<b>14.4</b>		Celery, raw	2.1	2.3
Dark-green vegetable	Broccoli, ck	73.9	51.6		Green pepper, raw	-	1.8
	Broccoli, raw	<u>2.2</u>	<u>6.7</u>		Cabbage, raw	<u>4.0</u>	<u>3.6</u>
	<b>Total broccoli</b>	<b>76.1</b>	<b>58.3</b>		<b>Total raw vegetable</b>	<b>19.6</b>	<b>34.2</b>
	Spinach, ck	14.1	12.4		Celery, ck	1.8	1.2
	Mustard greens, ck	-	3.0		Onions, ck	2.8	2.5
	Collards, ck	2.7	7.8		Mushrooms, ck	1.5	2.3
	Kale, ck	3.0	1.9		Cabbage, ck	3.0	4.2
	Turnip greens, ck	<u>2.5</u>	<u>4.8</u>		Mung bean sprouts	2.4	1.3
	<b>Total ck greens</b>	<b>22.3</b>	<b>29.9</b>		Cauliflower, ck	-	1.4
	Romaine, etc., raw	1.7	9.9		Zucchini, ck	1.6	2.5
	Spinach, raw	-	<u>2.0</u>		Asparagus, ck	-	<u>1.4</u>
	<b>Total raw greens</b>	<b>1.7</b>	<b>11.9</b>		<b>Total other ck</b>	<b>13.1</b>	<b>16.8</b>
Deep-yellow vegetable	Carrots, ck	41.8	48.5				
	Carrots, raw	<u>47.0</u>	<u>37.3</u>				
	<b>Total carrots</b>	<b>88.8</b>	<b>85.8</b>				
	Pumpkin, ck	2.3	1.3				
	Sweet potato, ck	5.1	9.2				
	Winter squash, ck	<u>3.7</u>	<u>3.8</u>				
	<b>Total other DY*</b>	<b>11.1</b>	<b>14.3</b>				

Table 1. Continued

Food group	Item-group	Child	All indiv.	Food group	Item-group	Child	All indiv.
<i>Percent</i>				<i>Percent</i>			
Whole grain	WW* bread	33.2	35.6	Meat, poultry, fish	Beef, fresh	18.6	21.4
	Rye bread	-	4.2		Pork, fresh	6.2	7.2
	Oatmeal bread	2.5	3.3		Pork, cured	2.9	3.2
	WW quick bread	<u>2.1</u>	<u>2.4</u>		Lamb	<u>0.7</u>	<u>1.1</u>
	<b>Total breads</b>	<b>37.8</b>	<b>45.5</b>		<b>Total meat cuts</b>	<b>28.4</b>	<b>32.9</b>
	WW crackers	4.2	2.8		<b>Ground beef</b>	<b>21.5</b>	<b>18.8</b>
	Corn tortilla	9.5	11.6		Beef lunchmeats	8.1	3.6
	Popcorn	3.6	5.2		Pork lunchmeats	<u>4.4</u>	<u>4.9</u>
	Brown rice	-	<u>1.6</u>		<b>Total lunchmeat</b>	<b>12.5</b>	<b>8.5</b>
	<b>Total snacks/other</b>	<b>17.3</b>	<b>21.2</b>		<b>Liver</b>	<b>0.3</b>	<b>0.5</b>
	WW cereal, RTE* & ck	11.5	16.9		Chicken	23.0	21.5
	Oatmeal, ck	15.9	8.4		Turkey	<u>3.9</u>	<u>5.1</u>
	Oat RTE cereals	<u>17.5</u>	<u>8.0</u>		<b>Total poultry</b>	<b>26.9</b>	<b>26.6</b>
	<b>Total cereals</b>	<b>44.9</b>	<b>33.3</b>		Lean finfish	3.3	4.3
Enriched grain	White bread	35.1	35.4		Fatty finfish	1.6	1.7
	French bread	1.4	4.0		Finfish, cnd	4.5	4.2
	English muffins	1.1	2.4		Shellfish	<u>1.0</u>	<u>2.8</u>
	Flour tortilla	1.4	2.3		<b>Total fish</b>	<b>10.4</b>	<b>13.0</b>
	Enr* crackers	<u>4.2</u>	<u>2.8</u>				
	<b>Total bread/crx*</b>	<b>43.2</b>	<b>46.9</b>				
	Enr quick breads	7.1	5.9				
	Biscuit	1.6	2.7				
	Cornbread	<u>2.4</u>	<u>3.3</u>				
	<b>Total quick breads</b>	<b>11.1</b>	<b>11.9</b>				
	Pasta, noodles	13.6	11.5				
	White rice	5.3	6.1				
	Grits	<u>1.5</u>	<u>1.0</u>				
	<b>Total pasta, rice</b>	<b>20.4</b>	<b>18.6</b>				
	Enr flour desserts	<b>14.4</b>	<b>17.8</b>				
	Corn RTE cereals	8.2	3.7				
	Rice RTE cereals	<u>2.7</u>	<u>1.1</u>				
	<b>Total cereals</b>	<b>10.9</b>	<b>4.8</b>				

<sup>1</sup>Children 2 to 6 years old and all individuals ages 2 years and older.

- Item-group had <1 percent representation in the composite.

\*Abbreviations: ck - cooked, cnd - canned, DY - deep-yellow, WW - whole wheat, RTE - ready-to-eat, Enr - enriched, crx - crackers.

Source: CSFII 1989-91, 3-day weighted samples.

**Table 2. Nutrient profiles for food group composites and milk: Nutrient values per serving for young children and all individuals<sup>1</sup>**

Nutrient	Dark-green vegetable		Deep-yellow vegetable		Legume		Starchy vegetable		Other vegetable	
	Child	All indiv.	Child	All indiv.	Child	All indiv.	Child	All indiv.	Child	All indiv.
Calories, kcal	24	21	34	37	108	109	75	78	21	19
Sodium, mg	29	26	43	44	164	155	27	24	100	74
Potassium, mg	278	244	205	207	372	368	260	278	205	184
Protein, g	2.6	2.1	0.8	0.8	7.2	7.3	1.9	2.0	1.0	1.0
Fat, g	0.3	0.3	0.1	0.1	0.3	0.5	0.3	0.2	0.3	0.2
Saturated fat, g	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0
Mono.* fat, g	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0
Poly.* fat, g	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1
Cholesterol, mg	0	0	0	0	0	0	0	0	0	0
Carbohydrate, g	4.4	3.8	7.9	8.7	19.7	19.5	17.3	17.9	4.4	3.9
Fiber, g	2.3	2.0	2.2	2.2	5.6	5.7	2.1	2.0	1.3	1.2
Vitamin A, RE	239	238	1685	1723	0	0	6	6	45	38
Vitamin C, mg	55	43	5	6	1	1	7	7	12	12
Folate, ug	57.9	56.1	10.8	11.4	82.1	84.0	16.6	15.8	16.8	20.6
Vitamin B <sub>12</sub> , ug	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Calcium, mg	55	52	20	21	43	42	7	8	25	20
Magnesium, mg	29.3	25.4	9.9	10.3	43.2	43.1	20.0	20.6	12.8	11.1
Iron, mg	1.10	0.97	0.39	0.40	2.25	2.27	0.46	0.54	0.61	0.52
Zinc, mg	0.38	0.32	0.18	0.19	0.93	0.93	0.32	0.32	0.19	0.18

**Dark-green vegetable.** *Broccoli was the predominant vegetable in this composite for children. Of all the composites, the one for dark-green vegetables had the highest vitamin-C value per serving.*

Cooked broccoli was the largest (74 percent) component and cooked spinach was the second largest (14 percent) component of the composite for dark-green vegetables (table 1). Thus the high percentage of broccoli helps to explain the high value of vitamin C per serving of this composite: 55 mg

(table 2). Children consumed much less cooked greens, raw broccoli, and romaine than did all individuals (table 1).

**Deep-yellow vegetable.** *This composite was mostly carrots, and it provided the highest amount of vitamin A of any composite.*

Most (89 percent) of the children's deep-yellow vegetable composite was carrots (table 1). Children ate more raw carrots than cooked carrots. Eaten primarily in candied form, sweet potatoes ranked a distant second in the composite.

One serving of the deep-yellow vegetable composite provided 1,685 RE vitamin A for children (table 2).

**Legume.** *Pinto beans accounted for the highest percentage of the children's composite for legumes. Of all the composites, this one contained the most calories and fiber per serving. Pinto beans ranked first (35 percent for children) in the legume composite (table 1). The top food codes in the item-group for pinto beans were pinto beans without fat and refried beans*



**Table 2. Continued**

Nutrient	Fruit		Whole grain		Enriched grain		Meat, poultry, fish (per ounce)		Milk <sup>2</sup>
	Child	All indiv.	Child	All indiv.	Child	All indiv.	Child	All indiv.	1 cup nonfat
Calories, kcal	74	68	80	78	86	83	56	55	86
Sodium, mg	3	2	60	69	104	115	82	67	126
Potassium, mg	237	245	60	56	30	31	89	88	406
Protein, g	0.7	0.8	2.8	2.6	2.3	2.3	7.7	7.7	8.4
Fat, g	0.2	0.2	1.2	1.1	1.1	1.1	2.5	2.4	0.4
Saturated fat, g	0.1	0.1	0.2	0.2	0.2	0.3	0.9	0.9	0.3
Mono. fat, g	0.0	0.0	0.4	0.4	0.5	0.5	1.0	1.0	0.1
Poly. fat, g	0.1	0.1	0.4	0.4	0.3	0.3	0.2	0.2	0.0
Cholesterol, mg	0	0	0	0	2	2	22	24	4
Carbohydrate, g	18.3	16.8	14.9	15.0	16.3	15.5	0.2	0.1	11.9
Fiber, g	1.1	1.2	2.1	2.0	0.6	0.6	0.0	0.0	0.0
Vitamin A, RE	12	28	2	2	2	2	9	18	76
Vitamin C, mg	24	30	0	0	0	0	1	1	2
Folate, ug	23.8	26.9	7.4	7.8	6.5	6.9	2.3	2.4	12.7
Vitamin B <sub>12</sub> , ug	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.6	0.9
Calcium, mg	13	13	19	20	23	26	4	4	302
Magnesium, mg	12.3	13.5	24.6	23.0	7.4	7.4	6.8	7.0	27.8
Iron, mg	0.34	0.27	0.81	0.76	0.80	0.80	0.55	0.55	0.10
Zinc, mg	0.08	0.10	0.54	0.50	0.20	0.21	1.11	1.10	0.98

<sup>1</sup>Children 2 to 6 years old and all individuals ages 2 years and older.

<sup>2</sup>A composite was not developed for the milk group. The nutrient profile was based on nonfat fluid milk.

\*Abbreviations: Mono. – monounsaturated; Poly. – polyunsaturated.

with added fat. White beans (eaten mostly in pork and beans/baked beans) and kidney beans (eaten mostly in chili con carne with beans) were, respectively, the second and third largest item-groups. Legumes contributed the most calories and dietary fiber per serving of all the composites; for children, one legume serving provided 108 calories and 5.6 g fiber (table 2). Legumes also provided the most copper per serving of all the composites, 0.20 mg.

**Starchy vegetable.** *Fried potatoes were the starchy vegetable most commonly eaten by young children.* White potatoes were the primary constituent of the composite for starchy vegetables (table 1); they were most often eaten with added fat—as potato chips and French fries. Because the composite was created using the form of the food lowest in fat, boiled potatoes were chosen as a proxy for fried potatoes. The smaller amount of baked potatoes in the children's composite, compared with that for all individuals, contributed

to a lower potassium value in children's nutrient profile (table 2). The second largest item-group in this composite was corn (table 1).

**Other vegetable.** *Almost half of children's servings of "other vegetables" were of tomatoes. This composite had one of the smallest servings per report (0.5), because the foods in this subgroup were used in small amounts in many mixed dishes.*

Tomatoes were the primary component (48 percent) of the composite for other

**Across all the food groups and sub-groups, children tended to have smaller serving sizes than did all individuals.**

vegetables; a higher percentage of its cooked form was consumed, compared with its raw form (table 1). Most of the servings of the cooked form were eaten as ingredients in grain mixtures. The main sources of raw tomatoes, other than those eaten by themselves, were Mexican mixtures (taco/tostada) and hamburger sandwiches. The large amount of cooked tomatoes, represented as canned in the composite, was the major contributor to the 100 mg sodium and 205 mg potassium per composite serving (table 2). The second largest item-group in the other vegetable composite for children was cooked green beans (19 percent) (table 1). Lettuce represented 12 percent of the children's composite, and the most frequently consumed food was plain lettuce. One composite serving of other vegetables provided 12 mg vitamin C, second to the dark-green vegetable subgroup, 55 mg per serving (table 2).

**Whole grain.** *About 45 percent of this composite was ready-to-eat and cooked cereals; most were fortified.* Whole-grain cereals were the largest component of the composite for whole grains (table 1). Both the ready-to-eat and cooked forms of wheat and oat cereals were eaten, and the instant variety was the most consumed type of all the cooked oatmeals. Many of the cereals in the item-groups for wheat and oat cereal were fortified. Children obtained added nutrients by eating these fortified cereals. Whole-wheat bread was 33 percent of the composite for whole grains, but cracked-wheat bread was the predominant food code in the item-group for whole-wheat bread. Cracked-wheat bread was in this item-group, because the wheat-based breads were grouped together. Corn tortilla had a fairly large representation (10 percent) in the composite for whole grains. Tortilla chips and corn chips

were the top food codes in the item-group for corn tortilla. For children, one serving from the composite for whole grains provided 2.1 g dietary fiber, 24.6 mg magnesium, and 0.5 mg zinc (table 2).

**Enriched grain.** *White bread was the largest component of the children's composite for enriched grains.*

White bread was the first (35 percent) and "enriched flour desserts and other sources of enriched flour" (shortened to just "enriched flour desserts") was the second largest component (14 percent) of the enriched-grain composite (table 1). The term "desserts" was used to identify the latter item-group because many of the food codes in it were sweet foods like cookies, doughnuts, pastries, pies, and cakes. Enriched flour in each of these foods was counted toward servings of enriched grains. The enriched flour in pizza crust was also included in this item-group. A low-sugar and low-fat food was used to represent the item-group for enriched flour desserts in the composite, but children were consuming added sugars and fat from these foods.

The third largest component of this composite was enriched pasta and noodles. The foods in this item-group that were most commonly eaten by children were macaroni and cheese and spaghetti with or without tomato sauce. Corn and rice ready-to-eat cereals combined were 11 percent of the children's composite; most were fortified. Wheat-flour tortillas constituted a separate item-group in the composite for enriched grains, because they were consumed in large amounts. Children ate more wheat-flour tortillas than English muffins or bagels. (Bagels were placed in the item-group for English muffins.)

As expected, the amount of fiber, magnesium, and zinc in the composite for enriched grains was lower than in the composite for whole grains.

**Meat, poultry, fish.** *Beef was 48 percent and poultry 27 percent of the children's composite for meat, poultry, and fish.* Children ate most of their beef in ground form: 22 percent of their composite for meat, poultry, and fish (table 1). Fresh beef, as in steak and roast beef, was about 19 percent of the children's composite for meat, poultry, and fish. Children's composite also contained about 8 percent beef lunch meats—mostly frankfurters. About 12 percent of the children's composite for meat, poultry, and fish was frankfurters and other lunch meats. Because of their higher fat content or water content or both, 2 ounces of sausages and lunch meats were counted as 1 ounce of lean meat in the Food Guide Servings Data Base. For example, a child who ate a 2-ounce hot dog was credited 1 ounce of lean meat.

Chicken, compared with turkey, was the most commonly eaten poultry: 23 versus 4 percent of the children's composite. And it was the roasted chicken breast without skin and chicken nuggets that accounted for 12 percent of all chicken servings. Many of the 188 food codes with poultry servings, which were reported consumed by children, were various fried chicken parts. Fried chicken was not, however, represented as such in the composite, because the leanest form of a food was used. All chicken was represented in the composite by a food code described as "chicken, boneless, not specified as to part, roasted, light or dark meat, skin not eaten."

Within the item-group for liver, children ate more chicken liver than beef liver.

Because children ate less beef liver than did all individuals, the children's composite contained less of vitamins A and B<sub>12</sub> (table 2).

Canned finfish, mostly tuna in water, was the predominant fish item-group (table 1). For both children and all individuals, the top foods consumed in the item-group for lean finfish were fried. Most servings of fatty finfish were fried catfish for both children and all individuals. Shrimp was the largest component of the item-group for shellfish for children and all individuals, both of whom ate more servings of steamed or boiled shrimp than fried shrimp.

The composite for meat, poultry, and fish contributed the most fat and saturated fat of all the composites (table 2). For children, 1 serving of meat, poultry, and fish provided 2.5 g fat, 0.9 g saturated fat, 7.7 g protein, 22 mg cholesterol, 0.5 ug vitamin B<sub>12</sub>, 0.55 mg iron, and 1.11 mg zinc.

**Milk.** *Children consumed more whole milk than did all individuals.*

Although a composite was not developed for the milk group, because the nutrient profile was to be based on nonfat fluid milk, CNPP did analyze how children consumed their servings of the milk group. Findings showed that about 84 percent of children's servings from the milk group were of fluid milk, 15 percent were of cheese, and 1 percent were of yogurt.

Children obtained the bulk of their servings of the milk group by drinking milk: about 92 percent of children's "milk as beverage" servings were whole, 2-percent, 1-percent, or skim milk. The remaining 8 percent of their "milk as beverage" servings were cocoa, milk shakes, chocolate milk,

and other flavored milks. Young children consumed a larger percentage of the category entitled "milk as beverage" as whole milk (47 percent) than did all individuals (35 percent). Children had 14 percent of servings from 1-percent or skim milk; all individuals had 21 percent from these types of milk.

Ice cream and ice milk were also part (about 4 percent) of children's servings of fluid milk. Children ate less pudding (1 percent of the servings of fluid milk) than ice cream and ice milk. Children also obtained fluid milk in mixtures such as cream sauces and soups, but in small amounts.

The milk group is represented by 1 cup skim milk, which provides 8.4 g protein, 86 calories, 0.3 g saturated fat, and 302 mg calcium (table 2).

### Serving Sizes

Across all the food groups and subgroups, children tended to have smaller serving sizes than did all individuals. Children's average intake was 1 serving per report for fruits and juices. When children ate cooked greens, raw broccoli, and romaine (dark-green vegetables), their serving sizes were much smaller than those for all individuals. Children had 0.9 servings, on average, per report. Of all five vegetable subgroups (dark-green, starchy, etc.), children's number of servings per report (0.4) was the smallest for the deep-yellow vegetable subgroup.

Children averaged 0.7 servings per report for legumes and 0.8 servings for starchy vegetables. Among starchy vegetables, children averaged 0.9 servings for potato chips and 0.7 servings for French fries. Children's number of servings per report of other vegetables



**By selecting foods somewhat differently in the food groups and subgroups, children can improve their nutrient intakes.**

averaged 0.5. The number of servings per report (0.2 for children) for individual item-groups was particularly small for cooked onions, raw celery, and cooked mushrooms, used in small amounts in many mixed dishes.

Children had an average of 1.2 servings per report from the composite for whole grains and 1.4 servings per report from the item-group for whole-wheat bread. Children averaged 1.2 servings per report across all foods in the composite for enriched grains, 1.4 servings for white bread, and 1.3 servings (a little over  $\frac{1}{2}$  cup) for enriched pasta and noodles. The halves of an English muffin or bagel constitute 2 servings of grains; children averaged 1.4 servings per report.

For items in the composite for meat, poultry, and fish, children averaged 1.4 ounces per report. For the milk composite, children consumed about  $\frac{3}{4}$  cup of milk (0.8 servings) per report and  $\frac{2}{3}$  cup of ice cream per eating occasion. For pudding, the average amount eaten per report was 0.5 servings ( $\frac{1}{2}$  cup).

Generally, the amounts reported for children 2 to 6 years old were about 60 to 80 percent of those for all individuals. This suggests that it is appropriate to continue to use two-thirds of the serving size designated for adults as a serving size for 2- to 3-year-olds when assessing nutrient levels in Food Guide Pyramid patterns for young children ages 2 to 3 (1,9). Two- to three-year-olds need two-thirds of the serving size for adults, except for milk. Two cups of milk are recommended for 2- to 3-year-old children. Four- to six-year-old children need the same serving sizes designated for adults.

### **Food Guide Pyramid Diet Patterns for Young Children**

The REI for 1- to 3-year-old children is 1,300 calories (2). A 1,600-calorie pattern was considered an appropriate objective for 4- to 6-year-old children. Although the REI for 4- to 6-year-old children is 1,800 calories, food consumption data reported for this age group in the CSFII 1989-91 averaged 1,533 calories.

Focus groups with parents, a consumer research aspect of the development of the Food Guide Pyramid for Young Children, indicated that parents were concerned that the amount of food their children ate might not be adequate to meet their nutrient needs.<sup>1</sup> It was important to determine whether a diet pattern set at a calorie level close to what children reportedly eat, and based on their reported food choices within food groups, could meet their nutrient requirements. It is not wise to have parents feed their children more food than needed—considering the prevalence of childhood obesity in the United States.

CNPP created the diet patterns as follows. For each food group and subgroup composite, the nutrients per Food Guide Pyramid serving were multiplied by the number of servings in the pattern and summed. Discretionary fat was added to bring the level of total fat in the 1,600-calorie pattern to 30 percent of calories and in the 1,300-calorie pattern to 34 percent of calories, the actual consumption level in the CSFII 1989-91 for 2- to 3-year-old children. Added sugars, represented as teaspoons of sugar, were then included to bring calories to the levels targeted for the two diet patterns.

<sup>1</sup>See Tarone (5).

**Table 3. Comparison of children's recommended intake with their consumption: Food group and subgroup servings per day**

Food group Subgroup	Recommended intake Food group servings		Actual intake <sup>1</sup> Avg daily servings CSFII 1989-91	
	1,300 calories	1,600 calories	2-6 yrs	All individuals
<b>Fruit</b>	1.33	2.00	1.19	1.12
<b>Vegetable</b>	2 servings	3 servings	1.41 servings	2.62 servings
Dark-Green	0.29	0.43	0.08	0.13
Deep-Yellow	0.38	0.57	0.06	0.14
Legume	0.29	0.43	0.08	0.17
Starchy	0.38	0.57	0.61	0.94
Other	0.67	1.00	0.58	1.25
<b>Grain</b>	4 servings	6 servings	4.55 servings	5.50 servings
Whole Grain	2.00	3.00	0.96	1.27
Enriched Grain	2.00	3.00	3.59	4.22
<b>Meat, poultry, fish</b>	3.33 ounces	5.00 ounces	2.55 ounces	4.37 ounces
Meat, Poultry, Fish	2.86	4.57	2.17	3.95
Egg	0.29	0.43	0.24	0.32
Nuts and Seeds	0.18	0.0	0.14	0.10
<b>Milk</b>	2.00	2.00	1.94	1.48
<b>Fat, total</b>	49.5 grams	53.4 grams	54.5 grams	70.4 grams
<b>Added sugars</b>	7 tsp	6 tsp	13.2 tsp <sup>2</sup>	19.5 tsp <sup>2</sup>
<b>Total calories</b>	1,304 kcal	1,613 kcal	1,435 kcal	1,796 kcal

<sup>1</sup>Calculated by dividing the total weighted number of servings reported over 3 days by 3 and then dividing by the weighted number of people in the samples.

<sup>2</sup>Estimated extra calories from added sugars in foods and small amounts of foods not accounted for in Food Guide Servings Data Base.

The 1,600-calorie pattern contained the minimal number of Food Guide Pyramid servings at the serving size recommended in the original Food Guide Pyramid (table 3). There were 2 servings of fruit, 3 of vegetables, 6 of grains, 5 ounces of meat, and 2 cups of nonfat milk, along with added fat and sugars. The 1,300-calorie pattern had the minimal numbers of Food Guide Pyramid food group servings reduced in size by

one-third for all food groups and subgroups except milk, to represent the one-third smaller serving size estimated for 2- to 3-year-old children. For example, 2 servings of fruit multiplied by two-thirds equaled 1.33 Food Guide Pyramid fruit servings in the 1,300-calorie pattern.

A total of 2 cups of milk was included in both diet patterns to meet calcium

recommendations. Because there is more fat permitted in the younger child's diet, CNPP substituted peanut butter for a portion of the meat servings in developing the 1,300-calorie pattern for 2- to 3-year-old children. This meat alternate, which is higher in fat content, represented the percentage of the meat group that young children consumed as nuts.

Table 4. Nutrient levels in Food Guide Pyramid patterns for young children<sup>1</sup>

Nutrient	RDA <sup>2</sup> or recommendation Child		1,300-calorie pattern Child		1,600-calorie pattern Child	CSFII 1989-91 consumption Child	
	1-3 yrs	4-6 yrs	2-3 yrs	4-6 yrs	4-6 yrs	2-3 yrs	4-6 yrs
<hr/>							
----- Kcal -----							
Calories (avg)	1,300	1,800	~1,300	~1,300	~1,600	1,288	1,533
<hr/>							
----- Percent of RDA -----							
Protein	16 g	24 g	361	241	325	305	244
Calcium	800 mg	800 mg	98	98	109	94	107
Magnesium	80 mg	120 mg	259	173	225	219	169
Iron	10 mg	10 mg	74	74	110	96	117
Zinc	10 mg	10 mg	77	77	107	68	82
Copper	0.7 mg	1.0 mg	100	70	100	98	81
Vitamin A	400 RE	500 RE	267	214	295	177	162
Vitamin E	6 mg	7 mg	98	84	89	78	77
Vitamin C	40 mg	45 mg	169	150	220	194	186
Niacin	9 mg	12 mg	122	92	130	143	134
Vitamin B <sub>6</sub>	1.0 mg	1.1 mg	104	95	133	117	126
Folate	50 ug	75 ug	329	219	303	378	295
Vitamin B <sub>12</sub>	0.7 ug	1.0 ug	513	359	460	492	371
<hr/>							
----- Percent of Kcal -----							
Fat <sup>3</sup>	<34	30	34.1	34.1	29.8	34.4	34.0
Saturated fat <sup>3</sup>	<13.6	<10	10.5	10.5	9.3	13.6	13.3
<hr/>							
----- Milligrams -----							
Cholesterol <sup>4</sup>	300	300	161	161	230	182	210
Sodium <sup>4</sup>	<2,400	<2,400	1,127	1,127	1,485	2,122	2,534
<hr/>							
----- Grams -----							
Fiber <sup>5</sup>	8	9-11	12.0	12.0	17.4	8.5	10.4

<sup>1</sup>Composite nutrient profiles based on children 2 to 6 years old.

<sup>2</sup>Recommended Dietary Allowances (RDA), 1989.

<sup>3</sup>U.S. Department of Agriculture and U.S. Department of Health and Human Services, 1995, *Nutrition and Your Health: Dietary Guidelines for Americans*.

<sup>4</sup>National Research Council, 1989, *Diet and Health*. National Academy Press, Washington, DC.

<sup>5</sup>American Health Foundation for "age plus 5" per day (Williams et al., 1995).

Source: CSFII 1989-91, 3-day weighted sample.

Total nutrient levels in the 1,300- and 1,600-calorie patterns were then compared with the 1989 RDA for children 1 to 3 and 4 to 6 years old and with other recommendations, as specified earlier, for fat, saturated fat, cholesterol, sodium, and dietary fiber (table 4).

Except for vitamin E (89 percent of the RDA), the 1,600-calorie pattern met or exceeded all nutrient requirements for children ages 4 to 6. Vitamin E was also less than the RDA in the 1,300-calorie pattern. However, the levels of vitamin E in the patterns exceeded the

amounts consumed by children, as reported in the CSFII 1989-91, because the composite for discretionary fat, which was based on food supply data for individuals of all ages, contained more vegetable fat (rich in vitamin E) than young children ate. The fat

composite had more polyunsaturated fat and less saturated fat than the amount consumed by children.

The 1,300-calorie pattern provided at least 100 percent of the RDA for most nutrients for both 2- to 3-year-olds and 4- to 6-year-olds. The major exceptions were the trace minerals—iron and zinc for both age groups and copper for the 4- to 6-year-olds. The amount of iron provided by the 1,300-calorie pattern was lower than the amount consumed by children, according to the CSFII 1989-91. The reason for this difference: composites for whole grains and enriched grains contained non-fortified breakfast cereals, but the cereals children ate were fortified. Additional analysis showed that when breakfast cereals included in the grain composites were changed to contain iron and zinc at fortification levels, the Food Guide Pyramid patterns provided recommended levels of iron and zinc for children.

The 1,300- and 1,600-calorie patterns met or nearly met objectives for fat, saturated fat, cholesterol, sodium, and dietary fiber. At 10.5 percent of calories in the 1,300-calorie pattern, saturated fat was somewhat lower than the actual level of consumption targeted for the 2- to 3-year-old child: 13.6 percent.

### Consumption of Food Groups

Table 3 shows the recommended numbers of food group and subgroup servings for the 1,300- and 1,600-calorie Food Guide Pyramid patterns developed for young children. The numbers of servings for vegetables, grains, and meat and meat alternates were derived as follows. Originally when the food guide was developed, the daily servings of vegetables were divided equally among dark-green/deep-yellow, legumes/

starchy, and other vegetables (1). For vegetables, "several" servings was defined as 3, so several times a week meant 3 times a week or 3/7 of 1 serving per day. For the 1,600-calorie pattern, 3 vegetable servings were divided into 1 serving each from dark-green/deep-yellow, legumes/starchy, and other vegetables. Hence the 3/7 (0.43) dark-green and 4/7 (0.57) deep-yellow provided 1 serving per day, the 0.43 legumes and 0.57 starchy provided another serving, and other vegetables provided the third serving per day. The numbers of grain servings were based on the Food Guide Pyramid recommendation to choose "several" servings a day of foods made from whole grains (6). For the meat and meat alternates, the number of egg servings was based on 3 eggs per week, and the meat, poultry, fish servings were calculated by difference (0.43 eggs subtracted from 5.0 ounces total meat and meat alternates).

The Food Guide Servings Data Base used in this study did not quantify the amount of added sugars in foods. These values were estimated from the calories in added sugars in foods and from the calories in small amounts of foods, such as raisins in oatmeal raisin cookies and garnishes and condiments, which were not counted by the Food Guide Servings Data Base. Calories were then expressed as average daily servings of added sugars, in teaspoons. Thus the average daily servings of added sugars may somewhat overestimate actual intakes of sugar. However, these estimated consumption levels of sugars were much higher than the levels of 6 teaspoons and 7 teaspoons (1,600- and 1,300-calorie patterns, respectively) suggested in the Food Guide Pyramid patterns.

## Conclusions

Children ate somewhat differently from the rest of the population, as indicated by composites of the food groups and subgroups, which were based on reported food consumption by young children ages 2 to 6 and all individuals ages 2 and older. However, the variations resulted in few substantial differences in the nutrient profiles of a composite serving of any of the food groups or subgroups.

Young children consumed smaller servings of foods, typically 60 to 80 percent of the average amounts for individuals of all ages. A serving that is two-thirds of the original Food Guide Pyramid serving is a reasonable estimate for assessing nutrient levels in patterns for 2- to 3-year-old children.

The 1,300-calorie Food Guide Pyramid diet pattern, which used the children's composites and nutrient profiles, met or nearly met objectives for most nutrients except for iron, zinc, and copper. The 1,600-calorie pattern met all of the objectives except for vitamin E. When iron and zinc were included at regular fortification levels in the ready-to-eat cereals used in the grain composites, diet-pattern levels of these nutrients met the RDA. Breakfast cereals were popular with young children, so ensuring that these cereals are fortified with iron and zinc can contribute substantially to meeting targeted intakes of these nutrients.

Copper was less than the RDA in the 1,300-calorie pattern for the 4- to 6-year-old, but the older child would probably be consuming closer to 1,600 calories. Older children could improve their reported copper intake by eating more legumes. Both the 1,300- and 1,600-calorie patterns were somewhat



low in vitamin E, but they exceeded the CSFII 1989-91 reported consumption levels of this nutrient. It is important to reduce fat in the diet as children age, from 2 to 5 years. Emphasis should also be given to replacing a portion of animal fats with vegetable oils, both to decrease saturated fat intakes and to increase vitamin E intakes. The results of the analysis on the RDA showed that most RDA would be met when the children's composites were used in the diet patterns. By selecting foods somewhat differently in the food groups and subgroups, children can improve their nutrient intakes.

Children's diets could be improved by including more servings of vegetables, especially dark-green and deep-yellow vegetables and legumes, and more whole-grain products. Replacing some of the apple and grape juices that children frequently drink with more servings of whole fruit could improve consumption of nutrients and dietary fiber. Replacing some lunch meats with lean meat, poultry, and fish may also improve nutrient intakes. Children's diets could be improved by their choosing foods that contribute more food guide servings and less added sugars.

## References

1. Cronin, F.J., Shaw, A., Krebs-Smith, S.M., Marsland, P., and Light, L. 1987. Developing a Food Guidance System to implement the Dietary Guidelines. *Journal of Nutrition Education* 19:281-302.
2. National Academy of Sciences, National Research Council, Food and Nutrition Board. 1989. *Recommended Dietary Allowances* (10<sup>th</sup> ed.). National Academy Press, Washington, DC.
3. National Research Council. 1989. *Diet and Health*. National Academy Press, Washington, DC.
4. Putnam, J.J. and Allshouse, J.E. 1996. *Food Consumption, Prices, and Expenditures, 1996: Annual Data, 1970-94*. U.S. Department of Agriculture, Economic Research Service. Statistical Bulletin No. 928. pp. 59, 61.
5. Tarone, C. 1999. Consumer research: Food Guide Pyramid for Young Children. *Family Economics and Nutrition Review* 12(3&4):33-44.
6. U.S. Department of Agriculture, Center for Nutrition Policy and Promotion. 1996. *The Food Guide Pyramid*. Home and Garden Bulletin No. 252.
7. U.S. Department of Agriculture, Center for Nutrition Policy and Promotion. 1997. *U.S. Food Supply Series 1909-1994*. (In-house data base.)
8. U. S. Department of Agriculture and U.S. Department of Health and Human Services. 1995. *Nutrition and Your Health: Dietary Guidelines for Americans* (4<sup>th</sup> ed.). Home and Garden Bulletin No. 232.
9. Welsh, S.O., Davis, C., and Shaw, A. 1993. *USDA's Food Guide: Background and Development*. U.S. Department of Agriculture, Human Nutrition Information Service. Miscellaneous Publication No. 1514.
10. Williams, C.L., Bollella, M., and Wynder, E.L. 1995. A new recommendation for dietary fiber in childhood. *Pediatrics* 96:985-988.



# Consumer Research: Food Guide Pyramid for Young Children

Catherine Tarone  
Center for Nutrition Policy  
and Promotion

Developed specifically as a guide for feeding young children, the Food Guide Pyramid for Young Children adapts recommendations of the original Food Guide Pyramid and provides messages, based on the food guide, that are helpful to parents and caregivers in improving the nutritional status of 2- to 6-year-olds. A qualitative consumer research study was conducted to identify needs of the target audience (parents and caregivers of 2- to 6-year-old children), to explore, with this audience, messages based on the food guide, and to evaluate prototype educational materials based on the food guide-based messages directed at behavior change. Parent- and caregiver-participants recommended emphasizing the message to "eat a variety of foods" as a theme for nutrition education materials that are designed to improve young children's diets. They also suggested that a "child-friendly" graphic of the Food Guide Pyramid would help young children remember the Pyramid. USDA produced a booklet presenting nutrition guidance messages and a "child-friendly" poster of the Food Guide Pyramid.

**T**he Food Guide Pyramid is USDA's primary nutrition education tool designed to help healthy Americans select a diet that is consistent with the Dietary Guidelines. The Food Guide Pyramid illustrates patterns of food selection that provide adequate amounts of food energy, protein, vitamins, minerals, and dietary fiber for good health but are moderate in fats, added sugars, and sodium. Adaptation and translation of dietary guidance into dietary practice are important components of any effort to help improve diets, including those of young children.

In Phase I of the project to develop a Food Guide Pyramid for Young Children, the Center for Nutrition Policy and

Promotion (CNPP) developed the technical nutrition basis for adapting the Food Guide Pyramid (6,7). CNPP staff determined that the nutrients in the foods children consume, if eaten in amounts recommended by the original Food Guide Pyramid, would meet children's nutrient needs. Because Pyramid food groups and recommended numbers of servings resulted in a nutritionally adequate diet for young children, the Pyramid graphic could be adapted for young children. Also during Phase I, eight message concepts emerged from the review of literature (5), discussions were held with nutrition educators, and comparisons were made of actual food group and subgroup consumption with the recommendations of the Food Guide Pyramid, as adapted for young children

(6). The concepts were explored and further developed during Phase II.

In support of USDA's nutrition education efforts to translate dietary guidance into consumer behaviors, CNPP conducted a qualitative consumer research study in Phase II. Qualitative research is particularly useful for gaining insights and a better understanding of the target audience. Qualitative research consists of open-ended, structured discussions or interviews with individuals or small groups of individuals—the purpose of which is to gather a greater depth of information than can be obtained by using quantitative techniques (3).

CNPP conducted qualitative research because consideration of the target audience, including its wants and needs, is the foundation of this research project to advance dietary guidance for children in a way that motivates behavior change in both adults and children. Recent research on the effectiveness of nutrition education programs, including those with preschool children, found that programs using educational methods directed at behavior change as a goal were more likely to be successful than programs that focused on information dissemination (4).

## Methods

The focus group study was conducted in two rounds. The objectives for the first round were to assess the nutrition information that parents and caregivers of 2- to 6-year-old children needed, to identify the key concerns for nutrition education, to assess familiarity with the Food Guide Pyramid, and to explore nutrition guidance messages (based on the food guide) for young children. The objectives for the second round were to determine whether the prototypes

effectively communicated nutrition guidance to the target audience of parents and caregivers of 2- to 6-year-olds. The discussions for the second round were designed to assess consumer reaction to the prototype materials (including their reactions to design and layout, readability, and applicability of the message concepts) and to identify any confusing or misleading information.

## Samples

For the first round, six focus groups, three with parents and three with caregivers, were conducted in January 1998. Parents were screened based on their ethnicity, household income, and educational level. Parents were also screened to ensure that they had at least one child 2- to 6-years-old and had not participated in a focus group within the last 6 months. Caregivers were included if they cared for 2- to 6-year-olds. (They could provide in-home care as well as care in larger facilities.) Twelve people were recruited for each group so that at least eight would attend. Some geographical dispersion was obtained by conducting one focus group with parents and a separate focus group with caregivers in each of three cities—Baltimore (Maryland), Richmond (Virginia), and Chicago (Illinois). Fifty-two adults participated in the first round of the study.

In July 1998 the second round began. One focus group with parents and another focus group with caregivers were held in each of three cities—Baltimore (Maryland), Richmond (Virginia), and Chicago (Illinois)—for a total of six groups. The screening criteria used for the first round were also used for this round. In addition, parents in Richmond and Chicago with 5- to 6-year-olds were screened to have their children participate in a mini-focus group. Twenty-

seven parents, 25 caregivers, and 8 children participated in the second round; none had participated in the first round.

## Procedures

For the first round of focus group studies, the moderator, with over 10 years of experience working with focus groups, led each group through the 2-hour sessions. Each focus group began with introductions and an icebreaker, followed by discussions based on the objectives. The discussions identified goals, benefits, and barriers to healthful eating, participants' knowledge of nutrition, and their feeding practices. The session then focused on the nutrition messages of the Food Guide Pyramid and how they apply to young children. Discussions ended on the eight messages regarding nutrition guidance and how to communicate them to young children.

All sessions were audio-taped and transcribed to obtain participants' exact responses to questions. Once transcribed, comments were color-coded and grouped according to content; this allowed key discussion themes to be uncovered. The moderator and his staff recorded and reported participants' verbal and non-verbal emotional expressions.

After the first round, CNPP developed the text of the materials to be used with the participants in the second round. The prototypes were designed and produced through USDA's Office of Communications Design Center. To emphasize the variety theme, CNPP used the slogan *I-2-3 Variety* in all three prototypes. The prototype for the parents, a full-color, 12-page booklet, *A Parents' Guide to Using the Food Guide Pyramid*, contained an adapted graphic of the Food Guide Pyramid. Also included was general nutrition

---

information that gives a better understanding of

1. healthful eating,
2. tips on increasing the variety of foods eaten,
3. meal planning and time-saving tips,
4. guidance on specific issues such as serving sizes and fat intake recommendations related to young children, and
5. age-appropriate kitchen activities.

The brochure *Caregivers: Using the Food Guide Pyramid for Young Children* was based on the assumption that most caregivers have access to nutrition education materials and have some knowledge of the Food Guide Pyramid. The brochure contained the new graphic and an explanation of changes made from the original Pyramid graphic, including text to make clear that the adapted Food Guide Pyramid does not replace the original Pyramid. Also included were a list of foods to encourage variety in the diet and a step-by-step food activity designed to involve young children. The third prototype, a poster of the adapted Food Guide Pyramid graphic, showed foods (drawn in a realistic style and shown in single serving sizes when possible) commonly eaten by young children. The names of the food groups were simplified, and the number of servings was represented by a single number rather than a range of numbers. The symbols for fat and sugars were eliminated, and food pictures were used in the tip.

One week before the sessions for the second round, parent-recruits were sent the text of the information that was prepared for parents; caregiver-recruits were sent the text of the information that was prepared for the caregiver's

brochure and the parents' booklet.

The recruits were instructed to read the material before attending their sessions; thus, focus group time would be used for discussion rather than be used, to a great extent, for reading.

The same moderator who led the first round of focus groups led the 2-hour second-round focus groups. At each session, following introductions and an icebreaker, participants were shown the prototype poster, *The Food Guide Pyramid for Young Children*, after which it was discussed and put aside. Each parent then received the information booklet *A Parents' Guide to Using the Food Guide Pyramid for Young Children*, and the moderator led a discussion designed to evaluate the booklet. Caregivers were given the brochure *Caregivers: Using the Food Guide Pyramid for Young Children*. Following a discussion to evaluate the brochure, each caregiver was given the parent booklet. Throughout these sessions, the participants were asked to read and respond to several sections of text and to the visual presentation of the materials.

The mini-focus group sessions with the children began with parents and children in the same room. Following a brief introduction and explanation of the process, the children were taken to a separate room where the moderator showed them a prototype poster of the Food Guide Pyramid. The moderator led the children in a discussion of the poster and the concept of healthful eating. The children were not asked about the other materials intended for adults that required an eighth-grade reading level. As with the first round, all sessions in the second round were audio-taped, transcribed, color-coded, and grouped according to content.

**The idea of using the graphic of the Food Guide Pyramid as a teaching tool, as it turns out, was a new concept for some parents.**



## Results

### The First Round

The 27 parent-participants in the first round of the focus group studies had at least one child 2 to 6 years olds; 78 percent were female. Forty-nine percent were African American; 37 percent, White; 11 percent, Hispanic; and 3 percent, Asian. Almost 80 percent had attended or graduated from college; about 40 percent had a household income between \$20,000 and \$40,000. Of the 25 participants who were caregivers, 24 percent worked in in-home child-care facilities.

As a qualitative research method, focus groups are not projectable to any population; however, they provide insight into how the consumer views the world and what the consumer thinks (8). Findings from this focus group research can be presented under four key discussion themes: Current Feelings Toward Feeding Young Children, Current Behavior and Knowledge, Food Guide Pyramid, and Nutrition and Dietary Behavior. All quotes from participants are taken from the unpublished reports prepared for USDA (1).

**Current Feelings Toward Feeding Young Children.** Identifying the key concerns of parents and caregivers for nutrition education and exploring benefits and barriers to an improved dietary pattern in young children resulted in a key theme.

*"One of the most important things to teach them at an early age is to set good standards and give them a good foundation as they grow." (Caregiver)*

*"There are a variety of things we try to accomplish through healthy eating . . . socialization, nutrition, emotional stability, which are related to food." (Caregiver)*

*"It's important that children learn good nutrition habits, so as they grow older, they will eat right instead of eating at one fast-food place one day and another fast-food place the next day." (Parent)*

*"If you teach them now, they are more apt to continue doing it rather than to introduce them to healthy foods after they have eaten years of junk food. It is easier to do it now." (Parent)*

Table 1 shows the benefits and barriers in the descending order in which they were mentioned by parents and caregivers. Results showed that these parents and caregivers think alike when discussing the benefits of healthful eating. They were asked: "What are the benefits of preparing healthy meals for younger children?" Most answered, "good health." The second benefit mentioned more often by both groups was, "developing good eating habits at an early age." Caregivers also pointed out that children are better behaved, have longer attention spans, and have energy to do things when they are fed well.

When it comes to feeding young children, parents most often mentioned the following barriers to healthful eating: the lack of time to plan and prepare meals, inexperience in dealing with picky eaters, and the negative influences of others.

*"Time is needed in three different places. You have to plan the meal, purchase it, and prepare it."*

*"I need information on what to do with an extremely picky eater who won't eat anything."*

*"If they are with somebody else, you don't have any control over the foods they eat."*

Caregivers seemed at ease when discussing nutrition and how they feed young children. Caregivers rarely mention having difficulty with "picky eaters." Instead, they said most children were willing to try a new food if they saw their friends eating the food. Several caregivers said parents were the biggest barrier to improving children's diets.

*"It's just a lack of knowing what is nutritious for a child. They [parents] think that a bag of chips and a soda are nutritious."*

*"Parents don't know what their children are supposed to eat as a balanced meal. I think it's important that we send the information home to the parents so that they [children] can eat healthy and be consistent with what we do."*

### Current Behavior and Knowledge.

All groups were quite knowledgeable about nutrition, based on the level of discussion of most parents and caregivers. When asked to rate themselves on a scale of 1 to 10 on how well they believe they provide their children with healthful and nutritious meals, parents rated themselves "average" to "above average"; caregivers rated themselves "above average" to "excellent." During further discussion, in spite of their knowledge of nutrition and ratings, many parents expressed feeling ill-equipped to feed their young children a healthful diet. They knew the "why's" but not the "how's."



**Table 1. Benefits and barriers to improving children's diets**

Benefits to improving diets	
<b>Parents say:</b>	<b>Caregivers say:</b>
Good health	Healthy children—less sickness
Good eating habits	Good eating habits
Minds work better	Energy
Better attitude	Happy children—happy parents
Food is a key part of a loving home	Emotional, cognitive, social growth
	Food is a key part of a nurturing environment
Barriers to improving diets	
<b>Parents say:</b>	<b>Caregivers say:</b>
Lack of knowledge	Parents
Lack of time to plan meals	Wasting food/wasting money
Lack of time to prepare meals	Food allergies
Negative influences of others	
Picky eaters	
Cost of food/wasting food	

*"Not enough of the information focuses on children. What we've been doing is taking adult information and applying it to children."* (Parent)

*"I think of nutrition and feeding my daughter as a challenge every day."* (Parent)

Most caregivers seemed both knowledgeable and comfortable discussing the "do's" and "don't's" of nutrition as each concept related to young children; caregivers were very comfortable with the "how's."

*"The goals of Head Start are pretty clear that nutrition is an integral part of the program."*

During the parents' discussions, first-time parents of very young children were most concerned about serving

sizes and whether their children were eating enough. Other parents said they had learned to deal with how much food to give children by offering them small portions and letting the children ask for more. Most parents said they did not insist on having children clean their plates. A few examples:

*"They say you shouldn't overwhelm them by offering too much."* (Parent)

*"I think you know your children. All three of my kids get different portions because I know my son will eat more, and one twin girl will eat more than the other."* (Parent)

*"When they're hungry, they will eat. If we could convince parents of that, our jobs would be a lot easier."* (Caregiver)

**Food Guide Pyramid.** To assess familiarity with the original Food Guide Pyramid, the moderator showed all groups the 1992 poster of the Food Guide Pyramid. Most parents said they are familiar with the graphic: they see it on food packages. Some parents also said that their young children are also familiar with it.

*"My son brought the Pyramid to my attention. He told me, 'Daddy, the bigger the slot is, the more food you're supposed to have.' He came to me at 3 years old and told me this."*

Most of the parents were able to discuss the Food Guide Pyramid and to speak about the foods they prepare or do not prepare in each of the food groups. Most were able to identify foods in each of the groups; a few were surprised that eggs and butter were not in the dairy group. Many parents said they see the

Food Guide Pyramid as a useful guide in planning meals.

*"The Pyramid is a guide for eating habits. You don't necessarily have to follow it to the letter, but it gives you an idea of what type of food to serve and how often you should have it."*

Most parents understood the concept of eating more foods from the base of the Pyramid and less foods from the tip. They also understood variety to mean eating different foods from all five main food groups. In the discussion on variety, many parents said they have no trouble getting their children to eat fruits, because fruits are sweet; however, getting them to eat vegetables can be a problem. The idea of using the graphic of the Food Guide Pyramid as a teaching tool, as it turns out, was a new concept for some parents.

*"I don't think I've ever thought about teaching my kids about nutrition with [our] sitting down with a picture and everything. I always thought they would learn from what we were eating because we eat fruits and we eat more breads."*

Most caregivers, on the other hand, said they often use the graphic, and other nutrition education materials based on the Food Guide Pyramid, with children. They also said their children are familiar with the Pyramid because the poster is hanging in classrooms, and the children see it every day.

*"The Food Guide Pyramid is around so much that even 2-year-olds have some sort of connection to it."*

Many of the caregivers in the focus groups participate in federally sponsored food programs and prepare and offer food

according to particular guidelines. The caregivers also receive from these programs nutrition education ideas and activities to use with their children. A few of the in-home child-care providers were not familiar with the Food Guide Pyramid and did not have formal nutrition education activities beyond those they created. (One in-home care provider sketched the Pyramid graphic to take home.) Caregivers affiliated with programs indicated that they have a lot of information but said they could use a listing of the wide variety of foods available and more ideas related to hands-on food activities for young children.

*"You need something that a teacher can work [with] in the classroom, an activity for the children. The best thing would be as a small group activity. You don't want something that you expect 40 kids to sit through, because 40 preschoolers aren't going to do that."*

Parents and caregivers liked the idea of the Food Guide Pyramid being used with young children, but most suggested that a graphic for young children should be "child-friendly"—so the young children can remember it as they learn.

*"Kids are pretty much guided by what they see, not so much by what they hear. Things that are pleasing to the eyesight they would probably pay more attention to."* (Parent)

*"If you could change the picture to meet a lot of needs, . . . I think it could be child-friendly and parent-friendly. This [original Pyramid] to me is grown-up friendly."* (Caregiver)

Some specific suggestions were also made to liven up the poster and to make

it quickly identifiable as a child's food guide.

*"I think it would help us to help them to eat food from the food groups if you made it more attractive to a child. It would give us an aid to help them. We could have a poster with little characters on it holding whatever."* (Parent)

*"Put some children on it."* (Caregiver)

*"Make the child a part of the whole Pyramid."* (Caregiver)

*"Put more stuff in there and more variety . . . Put the food in the form that the child is used to seeing it."* (Caregiver)

#### **Nutrition and Dietary Information.**

Reactions to the eight educational message concepts based on the food guide show how well the messages communicate nutrition guidance (table 2).

**Message 1:** "Increase variety and quality of vegetables eaten." Many parents reported having difficulty getting their children to eat any vegetables; others were happy if their children ate the same vegetable repeatedly. Some parents said their family had no variety in its choices of fruits and vegetables. Several parents thought a list of foods showing the varieties available would be useful. Thus they would then have an idea of a wider choice of foods to offer their family.

**Message 2:** "Offer a variety of healthful foods, and encourage children to try new foods." Parents and caregivers were reluctant to try new foods because of the waste factor. Many parents did not offer certain foods because they themselves did not like the foods. Some parents said they would try a new food,

**Table 2. Reactions of focus groups to key messages based on the Food Guide**

Messages	Reactions
1. Increase variety and quantity of vegetables eaten	<p><i>"I'd like to have a food list. I had one when I was pregnant . . . it was helpful."</i> (Parent)</p> <p><i>"There are some vegetables you like. It's hard to break out and have variety."</i> (Parent)</p>
2. Offer a variety of healthful foods, and encourage children to try new foods	<p><i>"It's very difficult to find foods that all children will eat. Some of the most nutritious foods end up getting thrown in the garbage, and that is very frustrating."</i> (Caregiver)</p> <p><i>"I always think of the same things, like macaroni and cheese or whatever I usually give them. I don't think I ever diversify."</i> (Parent)</p> <p><i>"If they won't eat it, what's the point."</i> (Parent)</p>
3. Increase the proportion of whole-grain and mixed-grain products	<p><i>"Once in a while [I offer these products to children]."</i> <i>"I tried bagels. What is a whole-wheat cereal? I'm sure we've eaten some."</i> (Parent)</p> <p><i>"We are close to a bread store. Often we go on field trips there. The children like the different kinds of breads."</i> (Caregiver)</p> <p><i>"You always think kids like white bread and grown-ups like dark bread. Not necessarily. Our kids eat dark bread."</i> (Caregiver)</p>
4. Emphasize greater use of whole fruits rather than juices	<p><i>"Children who drink juice eat less food."</i> (Parent)</p> <p><i>"If they get too much juice then they won't take in the food. That's the big problem. We see a lot of little kids whose parents haven't started feeding them; they just let them drink."</i> (Caregiver)</p>
5. Parents and caregivers serve as role models for healthful eating	<p><i>"I'm not crazy about carrots, but I will cook them and eat them."</i> (Parent)</p> <p><i>"I never tell my kids, 'Oh, I don't like that'."</i> (Parent)</p> <p><i>"In my center, everybody is required to sit down and eat with the children. That's one way the children learn. It's an opportunity for a teacher to teach them about nutrition."</i> (Caregiver)</p>
6. Be aware that young children need smaller serving size than adults [need]	<p><i>"I've been doing it all wrong. I give all of us the same amount of food. My youngest never finished anything. My husband tells me I give her too much."</i> (Parent)</p>
7. Be aware that children's appetites can vary day to day and do not overreact to food jags and "picky eaters"	<p><i>"I think that every child has the potential of being picky . . . a kid is a kid."</i> (Caregiver)</p> <p><i>"You have to encourage picky eaters. You sit down with them."</i> (Caregiver)</p> <p><i>"My child actually eats better away from home. She will eat things in her preschool that she will not eat at home because the other children around her are eating them, too."</i> (Parent)</p>
8. Encourage parents to participate in physical activity with children	<p><i>"Oh boy, it's very evident that I'm not getting enough exercise. It's mainly because of our work schedules. I know it's important too, but it's hard to find time to do it a lot of times."</i> (Parent)</p> <p><i>"My young child is very active. My older child is a couch potato."</i> (Parent)</p>

**Parents and caregivers liked the idea of the Food Guide Pyramid being used with young children, but most suggested that a graphic for young children should be "child-friendly" . . . .**

but if it were not well received, they would not offer it again for about 6 months.

**Message 3:** The amount of time spent on this message—"Increase the proportion of whole-grain and mixed-grain products"—was brief in all focus groups consisting of parents. Many of the parents said they eat whole-grain products themselves but do not offer them to their children. Caregivers, on the other hand, talked quite awhile about the different types of grain products they offer and how the children enjoy them.

**Message 4:** Regarding the need to "Emphasize greater use of whole fruits rather than juices," several parents said they let their children drink juice because it is easier than cutting up fruit. Many caregivers and some parents realize that drinking too much juice could cause eating problems.

**Message 5:** "Parents and caregivers serve as role models for healthful eating." A few parents did not think their eating habits had much to do with their children's habits, but most said they tried to eat healthfully so their children would do the same. Most of the caregivers understood the importance of sitting and eating with the children and the importance of offering foods for a healthful diet.

**Message 6:** "Be aware that young children need smaller serving sizes than adults need." Several parents said they offer small amounts of food, but others offered children the same amount, regardless of their ages.

**Message 7:** "Be aware that children's appetites can vary day to day and do not overreact to food jags and 'picky eaters'." Parents mentioned dealing with a "picky eater" more often than did caregivers. The caregivers believed that having all the children eat together helped to avoid eating problems.

**Message 8:** "Encourage parents to participate in physical activity with children" was the last educational message based on the food guide. Most parents believed that their 2- to 6-year-olds were active enough "on their own" and that parental involvement was more important with older children whose activity levels decrease when the school year begins.

These focus group discussions provided insights into what parents and caregivers want and need to improve diets of young children.

- Parents want directions. They want to know what to do; they want to use the Food Guide Pyramid; they want easy-to-read materials.
- Caregivers want activities that involve children, and they want more information on food variety.
- Parents and caregivers want a more "child-friendly" graphic of the Food Guide Pyramid to use with young children.
- Three prototypes are needed: a parent piece, a caregiver piece, and a "child-friendly" graphic of the Food Guide Pyramid, all based on one theme: "Choose a variety of foods for a healthful way of eating." All messages are simple, positive, behavior-oriented, and developmentally appropriate for young children.



## The Second Round

In the second round of the focus group study, all 27 parents had at least one child between 2 and 6 years old. Eighty-two percent of the parents were female; 27 percent, African American; 66 percent, White; and 5 percent, Hispanic. Eighty-one percent had attended some college or had graduated from college, and about 30 percent had household incomes between \$20,000 and \$40,000. Twelve percent of the 25 caregivers were employed by in-home child-care facilities that enrolled 2- to 6-year-olds. In addition to the six adult groups, two mini-focus groups with children were conducted. It was decided that children ages 5 and 6 would have sufficient communication skills to participate in the research.

The prototypes were well received. They were considered appealing in terms of colors, illustrations, and their "child-friendly" approach. The nutrition content was described as relevant, easy to read, and easy to understand. Both parents and caregivers considered the materials valuable tools to communicate key nutrition messages to help young children make healthful food choices and develop good eating habits. The participants were open to the idea of a Food Guide Pyramid that has been adapted to meet the needs of young children, and they showed interest in the parents' booklet and caregivers' brochure, which supplement the adapted graphic. All quotes from individuals participating in the focus groups are taken from the unpublished reports prepared for USDA (2).

**Poster Graphic.** Most adults thought the graphic would appeal to young children because of the colors, the realistic "child-friendly" art style, and the variety of recognizable food items. Adults said

the variety concept was communicated by the many foods illustrated, the pyramid shape with the five main food groups, and the number of servings of food groups offered each day.

*"I like the variety of pictures of foods . . . You can shop in the store and show the children those foods and the variety of grain foods and vegetables."* (Parent)

*"Well, I look at the Pyramid and I feel like it's more user-friendly. For kids, especially if they are too young to read, the pictures are easy to understand."* (Parent)

*"It's a tool for teaching children about nutrition. That's an important part of personal teaching, that you have an adult involved."* (Caregiver)

*"It's something a child could look at and actually understand."* (Caregiver)

The tip of the Food Guide Pyramid generated discussion about the meaning of moderation and how adults should deal with young children's intake of sugars and fat. Many parents wanted to include cakes, cookies, and snack foods as foods for the tip. A few parents wanted no food pictures in the tip because they thought that if their child saw a can of soda in the tip, the child would think it was alright to drink soda instead of milk. Other parents and most caregivers said the tip could be used to teach about "sometimes" or "limited-use" foods. The discussions indicate that more guidance about the tip of the Pyramid and the moderation message should be added to the information booklet.

The poster included information about foods that may be choking hazards for

very young children. Based on input from both parents and caregivers that this information is important but more appropriate within the information booklet, CNPP deleted the information from the poster but left it in the booklet.

The *I-2-3 Variety* slogan used on the three prototypes received mixed reviews. About half of the adults tried to figure out "the meaning" while the others thought it was a whimsical phrase to remind children to eat a variety of foods. Because of the mixed reviews, the slogan was not used in the final publications.

*"I don't understand the I-2-3 variety stuck in the middle of the poster. It does not explain what I-2-3 variety means anywhere on the poster."* (Caregiver)

*"I-2-3 variety is like ready, set, go. Like I-2-3, let's have variety, an attention getter."* (Caregiver)

The information collected from the children was limited, but they were interested in the poster illustrations, named all the foods, and talked about the foods they liked and disliked. Their discussions revealed that they do have some understanding of the benefits of healthful eating:

*"Eating healthy makes you get healthy, makes you get strong."* (Chicago child)

*"When I drink milk, I get strong muscles."* (Chicago child)

**Parent Booklet.** The parents liked the booklet because of the tips and facts, including the information on meal planning. And they liked the way information was presented in short,

highlighted points. Some thought information was new; others saw it more as helpful and useful reminders to what they already knew.

*"It helps you develop. It gives you planning tools, and it gives you good, solid information."* (Parent)

*"It's got everything in here. It's colorful, and I really think parents would pick it up and read it."* (Parent)

*"The simpler, the better, and this is simple. If you get more detailed, it gets to be too overwhelming and then they don't want to read it."* (Caregiver)

In general, the focus of the parents' information booklet (eating for a healthful diet) was understood, and participants were positive about the key message: eating a variety of foods is healthful.

*"Something like this reminds us of the importance of eating the right foods. I'm guilty of just putting something on the table, and it doesn't always match each food group. The picture is a good reminder."* (Parent)

Participants liked the reminder about smaller servings for 2- to 3-year-olds, and they especially liked the food list for serving sizes. The "Points for Parents" addressed the eight nutrition guidance messages. Parents liked the idea of offering whole fruit to their children, and many parents said their children drink too much juice. They acknowledged the importance of being a role model for promoting healthful eating habits for young children.

*"There are a lot of good ideas for parents of ways to get their kids to participate more in what they are going to eat."* (Parent)

At the suggestion of many parents, CNPP consolidated the five "Points for Parents" sections appearing throughout the booklet into one page entitled "Healthy Eating Tips . . . Encouraging food choices for a healthy diet" and placed it in the first half of the refined booklet. Almost everyone liked the artwork, especially the food illustrations on the graphic. Several respondents suggested that illustrations of young children be included in the booklet and added to the poster to communicate the fact that the materials were aimed at young children and that physical activity is important.

**Caregiver Brochure.** Most caregivers thought the information in the caregiver brochure was useful. They especially liked the list of foods, "Variety from the food groups," which contained 300 foods divided among the food groups of the Food Guide Pyramid.

*"The food list shows the breakdown of the grain group, where it says whole grain and then enriched and then the ones with more fat and sugar . . . I think it's good."* (Caregiver)

*It's good how you did the vegetable group. You put the dark green and yellow in their own groups and the starchy foods together in a group."* (Caregiver)

The experiential food activity "What's in my taco?" was also well received, and the caregivers liked the idea of having the recipe and instructions to send home with the children.

*"I think the activity is nice. It seems to be something you could do in the classroom that's easy and interesting."* (Caregiver)

*"There's a recipe on the back. I like that. I would let the kids take that home, and they could eat this at home as well."* (Caregiver)

The caregivers also evaluated the booklet designed for the parents. Most of them liked the information so much that they suggested that the food list and food activity from the caregiver brochure be added to the parents' booklet to create one information booklet for everyone. Overall findings indicated that one booklet for everyone, used along with the poster graphic, would be the most effective way to communicate the key messages based on the food guide. All parents and caregivers thought that an adult would have "to walk the child through" the Food Guide Pyramid to help the child understand the messages.

Participants generally thought the reading level and amount of information were good in both the booklet and brochure. The readability level was determined using the Flesch-Kincaid formula that calculates the grade level at which a reader would understand the material. A grade-level score of 6-10 is considered most effective for a general audience. The readability level of the prototypes is Grade 7.8.

## Summary

Learning the wants and needs of parents and caregivers for nutrition education of 2- to 6-year-olds can help with the development of materials that communicate nutrition guidance messages in appropriate and useful ways. Knowledge of what consumers believe, value, need, and do is as important as our knowledge of basic human nutrition (8). Many parents want and need direction—they want to know what to do to get their children to eat healthfully. Consumers want

# FOOD Guide PYRAMID

## for Young Children

A Daily Guide for  
2- to 6-Year-Olds



**FOOD IS FUN** and learning about food is fun, too. Eating foods from the Food Guide Pyramid and being physically active will help you grow healthy and strong.

### WHAT COUNTS AS ONE SERVING?

#### GRAIN GROUP

1 slice of bread  
1/2 cup of cooked rice or pasta  
1/2 cup of cooked cereal  
1 ounce of ready-to-eat cereal

#### VEGETABLE GROUP

1/2 cup of chopped raw or cooked vegetables  
1 cup of raw leafy vegetables

#### FRUIT GROUP

1 piece of fruit or melon wedge  
3/4 cup of juice  
1/2 cup of canned fruit  
1/4 cup of dried fruit

#### MILK GROUP

1 cup of milk or yogurt  
2 ounces of cheese

#### MEAT GROUP

2 to 3 ounces of cooked lean meat, poultry, or fish.  
1/2 cup of cooked dry beans, or 1 egg counts as 1 ounce of lean meat. 2 tablespoons of peanut butter count as 1 ounce of meat.

#### FATS AND SWEETS

Limit calories from these.

Four- to 6-year-olds can eat these serving sizes. Offer 2- to 3-year-olds less, except for milk. Two- to 6-year-old children need a total of 2 servings from the milk group each day.

# EAT a variety of FOODS AND ENJOY!



---

specifics about feeding their children—clear, easy, meaningful information on what they should do. Hence the Food Guide Pyramid for Young Children was created to help adults teach healthful eating behaviors to young children.

As a result of this research, USDA decided to refine and produce Food Guide Pyramid nutrition education materials for use with 2- to 6-year-olds. Released March 25, 1999, by Secretary Dan Glickman and Under Secretary Shirley R. Watkins, the materials are the 16-page, full-color booklet “Tips for Using the Food Guide Pyramid for Young Children 2 to 6 Years Old” and a full-color, 24" x 36" poster. Also available are a full-color Food Guide Pyramid graphic food record—“Plan for Your Young Child . . . The Pyramid Way”—and a black and white reproducible graphic of the Food Guide Pyramid (see figure). These materials may be accessed through the CNPP Web site at [www.usda.gov/cnpp](http://www.usda.gov/cnpp) (PDF format) or purchased through the Government Printing Office (Stock Number 001-000-04665-9).

USDA plans to cooperate with the public and private sectors to promote the Food Guide Pyramid for Young Children. The graphic is expected to be in use for many years in USDA food guidance materials and programs targeted to young children.

## References

1. Aeffect, Inc. 1998. *Adapting the Food Guide Pyramid for Young Children. Step 1 Management Report*. Unpublished report prepared for the U.S. Department of Agriculture, Center for Nutrition Policy and Promotion.
2. Aeffect, Inc. 1998. *Adapting the Food Guide Pyramid for Young Children. Step 2 Management Report*. Unpublished report prepared for the U.S. Department of Agriculture, Center for Nutrition Policy and Promotion.
3. Andreasen, A.R. 1995. *Marketing Social Change*. Jossey-Bass Publishers, San Francisco.
4. Contento, I. et al. 1995. The effectiveness of nutrition education and implications for nutrition education policy, programs, and research. *Journal of Nutrition Education* 27(6):279-283.
5. Escobar, A. 1999. Factors influencing children's dietary practices: A review. *Family Economics and Nutrition Review* 12(3&4):45-55.
6. Marcoe, K.L. 1999. Technical Research for the Food Guide Pyramid for Young Children. *Family Economics and Nutrition Review* 12(3&4):18-32.
7. Saltos, E. 1999. Adapting the Food Guide Pyramid for Children: Defining the target audience. *Family Economics and Nutrition Review* 12(3&4):3-17.
8. Sutton, S.M., Layden, W., and Haven, J. 1996. Dietary guidance and nutrition promotion: USDA's renewed vision of nutrition education. *Family Economics and Nutrition Review* 9(2):14-21.



# Factors Influencing Children's Dietary Practices: A Review

Alyson Escobar  
Center for Nutrition Policy  
and Promotion

This article briefly reviews research on children's dietary practices and discusses factors that affect their food choices and behaviors. The influence of food preferences on actual food selections and key factors that determine preferences in children are explored. Special attention is given to feeding practices within the child-care setting because the number of meals and snacks consumed in day-care homes and centers continues to increase.

**R**esearchers at the U.S. Department of Agriculture (USDA) Center for Nutrition Policy and Promotion (CNPP) used a multistage approach to develop the Food Guide Pyramid for Young Children. CNPP provided a research-based rationale for focusing on a food guide that could be used by parents and caregivers of preschool-age children (43). Using data from the Continuing Survey of Food Intakes by Individuals 1989-91, the Center developed composites for 1,300- and 1,600-calorie Pyramid-based diet patterns, all of which were based on children's food intake (35).

To gather input from the target audience, USDA researchers conducted a two-phase focus group study to obtain participants' evaluations of the prototype graphic and promotional materials (49). CNPP staff conducted additional research to determine whether any other issues needed to be considered in developing and promoting a food guide for the target audience.

The early years are a key time for experimenting with and establishing dietary habits, some of which may have a major influence on the risk for developing certain chronic diseases later in

life. Early experiences with food and eating are central to the acquisition of food preferences and patterns of food consumption (6). Children's food choices are further influenced by a wide variety of environmental and lifestyle factors (16, 41) that are important in the development, maturation, and modification of dietary behavior during childhood (24) and that are important determinants of dietary behavior among underserved, ethnically diverse groups of children (13). This paper briefly highlights several influences on young children's dietary behavior that may have implications for feeding as well as communicating food and nutrition messages to young children.

## Developmental Capabilities and Children's Dietary Practices

Children's dietary practices are influenced by their developmental stage, with the years between 2 and 6 marked by rapid social, intellectual, and emotional growth. Physical growth slows overall, with a decrease in growth rate reflected in a decrease in appetite and less interest in food (45).

Adding to the challenge of feeding young children is the emotional growth

**Young children are capable of learning to like and accept a wide variety of foods, and this learning occurs rapidly during the first few years of life.**

that takes place while they are toddlers. Toddlerhood marks the beginning of children's attempts to establish independence. As a result, children engage in power struggles with parents and caregivers. These conflicts often erupt during feeding situations, with toddlers refusing to eat until they get what they want and with adults torn between their need to control the situation and their desire to ensure that their child is well nourished.

As children progress into the preschool years, their emotional development continues to affect the feeding situation. Preschoolers are generally less fearful than toddlers and more eager to stretch their limits; to explore their world. They behave more consistently and are likely to be active in seeking attention and approval from adults. Thus their eating patterns become more established, and their food preferences are highly influenced not only by adults but also by peers (45). Birch found that children as young as 3 and 4 years could be persuaded to change their selection and consumption of different vegetables as a result of eating meals with their peer group whose preferences differed initially from their own (3). Furthermore, peer influence was strongest for the younger children in the group.

Preschool children also undergo major changes in development of their motor skills and other abilities. The progression from large motor skills to fine motor skills that occurs gives parents and caregivers a prime opportunity to engage children in food-preparation activities (26,27). Food preparation can be used to teach colors, shapes, sizes and size comparisons, cultural differences, and mathematical concepts (45).

## **Food Preferences and Acceptance and Children's Food-Related Behaviors**

One estimate has indicated that 25 to 50 percent of the variation in food consumption among individuals can be attributed to preference alone (38). One study of young Mohawk children, for example, has found that food preferences explained over 70 percent of the variation in dietary behavior (25). Another study has provided evidence of a strong correlation between food preferences and food choices in children as young as 3 years. This research also suggests that food preferences may have an even greater effect on children's food choices than on adults' choices (2).

Young children are capable of learning to like and accept a wide variety of foods, and this learning occurs rapidly during the first few years of life. Understanding the contribution of early learning and experiences to the development of food-acceptance patterns (e.g., which foods and how much of each an individual chooses to eat) can help foster development of healthful patterns and reduce parents' and caregivers' anxieties about feeding children (6).

## **Innate and Learned Factors**

Development of food-acceptance patterns begins during infancy with certain innate taste preferences: newborn infants respond positively to sweet tastes and negatively to sour and bitter tastes. While the reflexive nature of infants' responses to these tastes might suggest that food-acceptance patterns are "built-in" and difficult to change, research does not support this conclusion (8). Responses to basic tastes change with a child's repeated experiences with foods.

One preference of young children, more learned than innate (it appears), is that for high-fat foods. Possible explanations for this preference for fat are the pleasant feeling of satiety it provides in response to hunger and its association in many foods containing sugar and salt, both of which are preferred tastes among children (5).

A preference for high-fat foods may have important implications for obesity among children. Research with a group of 3- to 5-year-old children found a correlation between their preferences for high-fat foods and both their total fat intake and triceps skinfold measurements (20). In addition, parents of children with the strongest preferences for high-fat foods and the highest total fat intakes had higher composite BMI scores than parents of children with lower scores.

### **Familiarity and Food Choices**

Children tend to prefer foods that are familiar, compared with foods that are not, regardless of the foods' sensory characteristics (48). Birch et al. (8) have investigated children's tendency to reject what is new and how this tendency might be altered. The researchers' conclusion: changing rejection to acceptance can be as simple as providing a child with opportunities to sample a new food. However, having a child move from rejection to acceptance of new foods is a relatively slow process that may require as many as 10 exposures to a new food (48).

Building on previous research in this area, Skinner (46) found that 2- to 3-year-olds liked over 80 percent of food items that had been offered to them. She cautioned parents and caregivers to be careful about prejudging foods they think a child will not like or eat. She,



instead, encouraged parents to do their best to expose children to a variety of nutritious foods to try and perhaps accept into their diet.

Other dimensions of foods that contribute to their ultimate acceptance or rejection

by young children include smell, appearance, and textural characteristics (e.g., crunchiness, creaminess, and greasiness). However, children's responses to these characteristics are also influenced by their prior experiences with a food.



### Family Preferences and Culture

The social context in which foods are presented also influences whether they are accepted: young children who observe adults eating a certain food are more likely to eat it. Likewise, using a food as a reward or presenting it with some attention from the adult also enhances a child's acceptance of it (8). But rewarding children for eating a certain food tends to decrease their acceptance of that food.

Skinner et al. (46) have found a strong relationship between the food preferences of toddlers and those of their mothers, fathers, and older siblings, but no family member appeared to have more influence than another had on children's preferences. Likewise, Burt and Hertzler (14) have found that mothers' and fathers' food preferences had a positive and equal influence on preferences of their 5- and 6-year-old children.

Other studies have also shown positive correlations between parents' and their young children's preferences, but the associations were not always significant and varied somewhat with children's ages (4, 14, 39). A meta-analysis of five studies demonstrated a small but significant correlation between the food preferences of parents and those of their children 2 to 24 years of age (9). The strength of the resemblance was similar for mothers' and fathers' preferences.

Studies of families' food preferences have identified factors in addition to parents' preferences that affect children's food preferences. Birch (4) concluded that the resemblances in food preferences of parents and those of 128 pre-school children were at least partially explained by cultural similarities. However, other studies obtained somewhat different results. Pliner (40) found that

the food preferences of children 24 to 83 months old matched those of their real family more closely than those of "pseudo" families (unrelated families from the same socioeconomic group).

### Effects of Parental Concerns, Nutrition Knowledge, Beliefs, and Practices

Although research indicates that young children overall are likely to meet their nutrient needs, parents continue to express concerns about their children's dietary habits. In spite of the rise in childhood obesity, parents of young children are more apt to report being concerned about the perceived lack of food children consume than about the types of food consumed or the eating environment (47). Parents had several primary concerns about children's eating habits:

- Not eating enough. (Seventeen percent describe their child as a "picky eater.")
- Eating too many sweets.
- Eating a limited number of foods. (Meats and vegetables are most often disliked.)
- Not drinking enough milk.

Some studies have explored the effects of parents' nutrition knowledge on their children's knowledge and dietary practices. Contento et al. found that Latino mothers' nutrition knowledge and attitudes toward nutrition were positively correlated with nutrient intakes of their 4- to 5-year-old children (15). Kirks et al. (31) found that involving parents in a nutrition education program for primary-grade students increased the diversity and quality of students' diets. Furthermore, a 5-year follow-up with the same students showed that they continued to eat a better quality diet than students

whose parents had not participated in the original nutrition education intervention (32). Thus parental involvement appeared to increase the family's overall nutrition knowledge as well as the likelihood that nutrition information would be integrated into family food-shopping and food-preparation practices.

Compared with other children, those from families whose mothers considered healthfulness an important criterion for selecting foods consumed diets significantly lower in calories, fat, saturated fat, and sucrose and higher in fiber and vitamin A (15). Oliveria et al., examining the relationship between nutrient intakes of parents and their 3- to 5-year-old children participating in the Framingham Children's Study, found a modest but significant association between parents' and children's intakes for most nutrients (37). The association was stronger between mothers and children than fathers and children, and the strength of the association increased with the number of meals parents consumed at home.

Stanek (47) identified other parenting behaviors that were correlated positively with the nutrient adequacy (defined as number of servings from the major food groups) of the diets of 2- to 5-year-olds:

- Having the child prepare food or set the table.
- Allowing the child to make decisions about the type of food eaten.
- Giving small portions when serving a new food.
- Using discussion versus other techniques to persuade the child to eat.
- Forcing the child to eat a few bites of a food.
- Praising the child for eating healthful foods.





Stanek also found a positive correlation between the quality of the home environment (measured as degree of cohesion, expressiveness, and conflict within the family) and the nutrient adequacy of the children's diets. Children who ate with parents, siblings, or both at mealtime also had better diets, defined as more servings from the five basic food groups.

### **Effects of Maternal Employment on Children's Dietary Behavior**

Maternal employment is another factor that has been studied in relation to family food consumption patterns and children's

diets in the United States. Kirk ranked, from most important to least important, influences on working mothers' food choices for their families: Nutrition, time, catering to family members' desires, budget, management and organization, health, season and weather, and socialization (30). Johnson concluded that increased time pressure was one of the most significant factors affecting children's food choices: in general, the more hours women work outside the home, the fewer hours they spend preparing meals and the more meals their children eat away from home. This increase in away-from-home eating, however, represents primarily meals

eaten in schools and child-care centers, which often have a positive effect on children's overall nutrient intakes. Negative effects of maternal employment on children's dietary status have not yet been identified (28).

### **Family Influences on Other Aspects of Children's Dietary Behavior**

Investigators have examined how families affect children's attitudes toward nutrition, awareness of nutrition, the time they spend eating, and their ability to regulate their energy intake. Gillespie and Achterberg (23) found, among

---

**Parents, caregivers, and nutrition educators have significant roles in helping children develop healthful food-related behaviors.**

parents participating in a nutrition education program, more positive attitudes toward nutrition and higher scores on an instrument measuring family interactions. Parents participating in the nutrition education program, compared with other parents, also reported discussing food and nutrition topics with their families more frequently. Involving children in food-related decisions and activities can increase their awareness of nutrition and bring about changes in dietary behavior. Anliker found that both the quantity and specificity of parents' messages about foods were correlated positively to children's nutrition knowledge (1).

Klesges, in studies of the effects of parental influences on preschool children's food selections, found that parental encouragement to eat was correlated positively with the amount of time children spent eating (33,34). Both actual and threatened parental monitoring of food choices for a given meal had a marked effect on children's food selections by lowering total calories and sugar content of the meal.

Young children's ability to regulate their total energy intake is well documented (7,44), although children vary tremendously in what and how much they eat. Johnson and Birch examined the relationships among 3- to 5-year-old children's eating behavior, adiposity, and familial factors: such as parents' adiposity, eating style, diet history, and child-feeding practices (29). The results of their study: individual differences in ability to self-regulate energy intake were related to adiposity, with the fattest children being the least precise in this regulation. This is particularly pronounced in girls (6). Children who were the least responsive to the energy content of their diet also had

parents who reported using the most rigid controls over their children's eating.

Another study, with 3-year-olds, found that the children with more control over food choices were significantly more aware of the role of foods in energy balance, and those children who were more involved in food-related activities had significantly higher levels of nutrition awareness (1). The study also found that the mothers of these children had some similar characteristics: they were more educated, more permissive, and employed outside the home.

### **Child-Care Programs and Children's Dietary Behavior**

The nutrient contribution of foods served and the food choices by children in child-care settings have a substantial effect on the overall quality of children's diets. Briley et al. (12) found that the nutrition knowledge and practices of food service personnel in child-care settings had a major influence on the menus served there. USDA's 1997 evaluation of the food preparers of the Child and Adult Care Feeding Program (CACFP)<sup>1</sup> found that they had a reasonably good understanding of general nutrition and Dietary Guidelines principles (22). The combination of meals and snacks offered by CACFP providers supplied more than half of the RDA for energy and two-thirds of the RDA for other key nutrients (22). However, earlier research studies conducted on-site at several licensed child-care centers found that menus did not meet children's nutrient requirements consistently, even

<sup>1</sup>CACFP provides Federal funds for meals and snacks served to children in nonresidential day-care centers. CACFP has established minimal meal-pattern requirements for child-care providers; it specifies both meal components and minimal portion sizes according to children's age (22).

when CACFP meal-pattern requirements were followed (10,17,19). Nutrients reported below 50 percent of the RDA in menus designed for preschoolers at certain sites included calories, iron, zinc, and vitamin A (10,12,17). In addition, menus often exceeded recommended guidelines for fat, saturated fat, and sodium.

Another study conducted in family day-care homes in Texas found that menus were adequate for all nutrients, except iron; however, adequacy depended in part on serving amounts of foods that were twice the minimum serving required by the CACFP (11). Studies prior to USDA's 1997 study had identified numerous gaps in providers' knowledge of nutrition that affected the nutrient adequacy of meals and snacks that were served (10,11,12,19).

Other factors that influence what is served to young children at child-care centers include requirements of the food program, staff perceptions of children's food preferences, history of the food programs at the center, and cost (12). Studies reveal that centers sometimes failed to serve required portions of foods because providers did not believe children would eat the whole amount (12). In general, providers rarely talked with the children about the sources of food or its benefit to them. They, however, did coax children to eat their meals and snacks.

Food and nutrition practices in child-care programs extend beyond what foods children are served. Nahikian-Nelms examined the nutrition knowledge, attitudes, and behaviors of caregivers in child-care settings to determine whether attitudes and behaviors thought to be important in the development of good eating habits were typically



practiced (36). Results indicated that while caregivers held beliefs that were expected to have a positive effect on children's dietary behavior, caregivers also engaged in mealtime behaviors that were inconsistent with their beliefs and experts' recommendations. For example, caregivers sometimes failed to dine

with children, or they consumed foods that were different from those being consumed by the children. Also, mealtimes were often dominated by caregivers' rule-setting behaviors that precluded any opportunity to discuss food and nutrition topics with the children.



---

## Conclusions

This literature review, focusing on children's dietary practices, complements the findings from the other components of the USDA project to develop a food guide for young children (35,43,49). Overall, the review indicates associations between young children's food preferences and the food-related practices of their parents and caregivers.

Parents, caregivers, and nutrition educators have significant roles in helping children develop healthful food-related behaviors. Findings indicate that parents and child-care providers should choose developmentally appropriate foods, provide structured meals and snacks, and ensure a pleasant eating environment. Parents and caregivers must be persistent and patient in offering children a variety of both new and familiar foods to promote children's acceptance of new foods. Child-care providers, important co-participants with parents in helping children learn about and practice healthful eating habits, are responsible for making a variety of nutritious foods available and for serving as role models for the children in their care.

Helping parents understand the importance of learning and experience in the formation of children's food preferences may enable them to foster development of healthful eating patterns and lessen their anxieties about child feeding. Nutrition educators can help parents and caregivers of young children identify and develop appropriate food-related behaviors, as well as teach them how to avoid undesirable ones. Educators should carefully assess parents' and caregivers' needs in developing programs or materials for them and their children. Topics that may be appropriate for discussion range

from food composition and nutrient needs to stages of child development and family communication skills.

The Food Guide Pyramid for Young Children 2 to 6 Years Old (50) was developed as a tool for parents and caregivers to use both to feed young children and to communicate food and nutrition messages to them. It was developed with focus group input from both parents and caregivers about the nutritional needs of young children and key concerns and barriers to meeting those needs at home and in the child-care setting.

Materials that accompany the adapted food guide highlight several of the findings from research on children's dietary practices, including (1) the importance of offering children a variety of foods to meet their nutritional needs; (2) the need to introduce and continually reintroduce the same foods to children; (3) the principle that parents and caregivers are responsible for offering children nutritious food choices, while children are responsible for deciding what and how much they eat; (4) the importance of being flexible with amounts of foods served at a given eating occasion; and (5) the need to involve all family members in making healthful food choices. The Food Guide Pyramid for Young Children also stresses the importance of role modeling and the need for parents and caregivers to work together to improve children's dietary habits. Numerous practical tips and hands-on, developmentally appropriate activities are provided to help parents and caregivers introduce food-preparation skills to young children.

Focusing on changing what children like to eat through repeated exposure to healthful foods and parental and

community involvement in modeling healthful eating behavior is more likely to be effective in reaching young children than simply teaching to increase nutrition knowledge (25). To be successful in promoting and reinforcing diets consistent with the Dietary Guidelines and the Food Guide Pyramid, nutrition educators and programs need to target all environments of the preschool child—home, school, and community (42).



---

## References

1. Anliker, J., Laus, M., Samonds, K., and Beal, V. 1990. Parental messages and the nutrition awareness of preschool children. *Journal of Nutrition Education* 22:24-29.
2. Birch, L. 1979. Preschool children's food preferences and consumption patterns. *Journal of Nutrition Education* 11:189-192.
3. Birch, L. 1980. Effects of peer models' food choices and eating behaviors on preschoolers' food preferences. *Child Development* 51:489-496.
4. Birch, L. 1980. The relationship between children's food preferences and those of their parents. *Journal of Nutrition Education* 12:14-18.
5. Birch, L. 1992. Children's preferences for high-fat foods. *Nutrition Reviews* 50:249-255.
6. Birch, L. 1996. Children's food acceptance patterns. *Nutrition Today* 31(6):234-240.
7. Birch, L., Johnson, S., Andresen, G., Peters, J., and Schulte, M. 1991. The variability of young children's energy intake. *New England Journal of Medicine* 324:232-235.
8. Birch, L., Johnson, S., and Fisher, J. 1995. Children's eating: The development of food acceptance patterns. *Young Children* 50(2):71-78.
9. Borah-Giddens, J. and Falciglia, G. 1993. A meta-analysis of the relationship in food preferences between parents and children. *Journal of Nutrition Education* 25:102-107.
10. Briley, M., Buller, A., Roberts-Gray, C., and Sparkman, A. 1989. What is on the menu at the child care center? *Journal of the American Dietetic Association* 89:771-774.
11. Briley, M., Coyle, E., Roberts-Gray, C., and Sparkman, A. 1989. Nutrition knowledge and attitudes and menu planning skills of family day-care providers. *Journal of the American Dietetic Association* 89:694-695.
12. Briley, M., Roberts-Gray, C., and Simpson, D. 1994. Identification of factors that influence the menu at child care centers: A grounded theory approach. *Journal of the American Dietetic Association* 94:276-281.
13. Bronner, Y.L. 1996. Nutritional status outcomes for children: Ethnic, cultural, and environmental contexts. *Journal of the American Dietetic Association* 96:891-900.
14. Burt, J. and Hertzler, A. 1978. Parental influence on the child's food preference. *Journal of Nutrition Education* 10:127-128.
15. Contento, I., Basch, C., Shea, S., Gutin, B., Zybert, P., Michela, J., and Rips, J. 1993. Relationship of mothers' food choice criteria to food intake of preschool children: Identification of family subgroups. *Health Education Quarterly* 20: 243-259.
16. Crockett, S. and Sims, L. 1995. Environmental influences on children's eating. *Journal of Nutrition Education* 27:235-249.
17. Domer, J.A. 1983. Nutrition in a private day care center. *Journal of the American Dietetic Association* 82:290-293.

- 
18. Dunn, P., Lackey, C., Kolasa, K., and Mustian, R. 1994. Nutrition education interests of parents of 5- to 8-year-old children. *Journal of Nutrition Education* 26:284-286.
  19. Drake, M. 1992. Menu evaluation, nutrient intake of young children, and nutrition knowledge of menu planners in child care centers in Missouri. *Journal of Nutrition Education* 24:145-148.
  20. Fisher, J. and Birch, L. 1995. Fat preferences and fat consumption of 3- to 5-year-old children are related to parental adiposity. *Journal of the American Dietetic Association* 95:759-764.
  21. Food and Consumer Service, U.S. Department of Agriculture. 1995. *Child and Adult Care Food Program: Nutrition Guidance for Child Care Centers*. Alexandria, VA.
  22. Food and Consumer Service, U.S. Department of Agriculture. 1997. *Early Childhood and Child Care Study: Nutritional Assessment of the Child and Adult Care Food Program*. Alexandria, VA.
  23. Gillespie, A. and Achterberg, C. 1989. Comparison of family interaction patterns related to food and nutrition. *Journal of the American Dietetic Association* 89: 509-512.
  24. Hammer, L. 1992. The development of eating behavior in childhood. *Pediatric Clinics of North America* 39:379-394.
  25. Harvey-Berino, J., Hood, V., Rourke, J., Terrance, T., Dorwaldt, A., and Secker-Walker, R. 1997. Food preferences predict eating behavior of very young Mohawk children. *Journal of the American Dietetic Association* 97:750-753.
  26. Hertzler, A. 1989. Preschoolers' food handling skills—motor development. *Journal of Nutrition Education* 21:100B.
  27. Hertzler, A. and DeBord, K. 1994. Preschoolers' developmentally appropriate food and nutrition skills. *Journal of Nutrition Education* 26:166B.
  28. Johnson, R., Crouter, A., and Smiciklas-Wright, H. 1993. Effects of maternal employment on family food consumption patterns and children's diets. *Journal of Nutrition Education* 25:130-133.
  29. Johnson, S. and Birch, L. 1994. Parents' and children's adiposity and eating style. *Pediatrics* 94:653-661.
  30. Kirk, M. and Gillespie, A. 1990. Factors affecting food choices of working mothers with young families. *Journal of Nutrition Education* 22:161-168.
  31. Kirks, B., Hendricks, D., and Wyse, B. 1982. Parent involvement in a nutrition education program for primary grade students. *Journal of Nutrition Education* 14:137-140.
  32. Kirks, B. and Hughes, C. 1986. Long-term behavioral effects of parent involvement in nutrition education. *Journal of Nutrition Education* 18:203-206.
  33. Klesges, R.C., Malott, J.M., Boschee, P.F., and Weber, J.M. 1986. The effects of parental influences on children's food intake, physical activity, and relative weight. *International Journal of Eating Disorders* 5:335-346.

- 
34. Klesges, R., Stein, R., Eck, L., Isbell, T., and Klesges, L. 1991. Parental influence on food selection in young children and its relationship to childhood obesity. *American Journal of Clinical Nutrition* 53:859-864.
  35. Marcoe, K.L. 1999. Technical research for the Food Guide Pyramid for Young Children. *Family Economics and Nutrition Review* 12(3&4):17-31.
  36. Nahikian-Nelms, M. 1997. Influential factors of caregiver behavior at mealtime: A study of 24 child-care programs. *Journal of the American Dietetic Association* 97:505-509.
  37. Oliveria, S., Ellison, R., Moore, L., Gillman, M., Garrahe, E., and Singer, M. 1992. Parent-child relationships in nutrient intake: The Framingham Children's Study. *American Journal of Clinical Nutrition* 56:593-598.
  38. Pilgrim, F. J. 1961. What foods do people accept or reject? *Journal of the American Dietetic Association* 38:439-443.
  39. Pliner, P. 1983. Family resemblance in food preferences. *Journal of Nutrition Education* 15:137-140.
  40. Pliner, P. and Pelchat, M. 1986. Similarities in food preferences between children and their siblings and parents. *Appetite* 7:333-342.
  41. Ray, J. and Klesges, R. 1993. Influences on the eating behavior of children. *Annals of the New York Academy of Sciences* 699:57-69.
  42. Reed, D. 1996. Focus groups identify desirable features of nutrition programs for low-income mothers of preschool children. *Journal of the American Dietetic Association* 96:501-503.
  43. Saltos, E. 1999. Adapting the Food Guide Pyramid for Children: Defining the target audience. *Family Economics and Nutrition Review* 12(3&4):3-16.
  44. Shea, S., Stein, A., Basch, C., Contento, I., and Zybert, P. 1992. Variability and self-regulation of energy intake in young children in their everyday environment. *Pediatrics* 90:542-546.
  45. Sigman-Grant, M. 1992. Feeding preschoolers: Balancing nutritional and developmental needs. *Nutrition Today* July/August.
  46. Skinner, J., Carruth, B., Moran, J., Houch, K., Schmidhammer, J., Reed, A., Coletta, F., Cotter, R., and Ott, D. 1998. Toddlers' food preferences: Concordance with family members' preferences. *Journal of Nutrition Education* 30:17-22.
  47. Stanek, K., Abbott, D., and Cramer, S. 1990. Diet quality and the eating environment of preschool children. *Journal of the American Dietetic Association* 90:1582-1584.
  48. Sullivan, S. and Birch, L. 1990. Pass the sugar, pass the salt: Experience dictates preference. *Developmental Psychology* 26:546-551.
  49. Tarone, C. 1999. Consumer research: Food Guide Pyramid for Young Children. *Family Economics and Nutrition Review* 12(3&4):33-44.
  50. U.S. Department of Agriculture. 1999. *Tips for Using the Food Guide Pyramid for Young Children Two to Six Years Old*. Program Aid 1647.

# Expenditures on Children by Families, 1999

Mark Lino  
Center for Nutrition Policy  
and Promotion

Since 1960 the U.S. Department of Agriculture has provided estimates of expenditures on children from birth through age 17. This article presents the most recent estimates for husband-wife and single-parent families. Data are from the 1990-92 Consumer Expenditure Survey. The Consumer Price Index is used to update income and expenditures to 1999 dollars. Data and methods used in calculating child-rearing expenses are described. Estimates are provided for major components of the budget by age of the child, family income, and region of residence. Expenses on the younger child in a two-child, husband-wife household for the overall United States averaged \$6,080 to \$13,800 in 1999, depending on the child's age and family income group. Adjustment factors for number of children in the household are also provided. Results of this study can be used in developing State child support guidelines and foster care payments and in developing family educational programs.

**S**ince 1960 the U.S. Department of Agriculture (USDA) has provided estimates of expenditures on children from birth through age 17. These estimates are used in setting child support guidelines and foster care payments and in developing educational programs on parenthood. This study presents the latest child-rearing expense estimates, which are based on 1990-92 expenditure data updated to 1999 dollars. The study presents these new estimates for husband-wife and single-parent families. It briefly describes the data and methods used in calculating child-rearing expenses<sup>1</sup> and then discusses the estimated expenses.

<sup>1</sup>The report "Expenditures on Children by Families: 1999 Annual Report" provides a more detailed description of the data and methods. To obtain a copy, contact USDA, Center for Nutrition Policy and Promotion, 1120 20th Street NW, Suite 200 North Lobby, Washington, DC 20036 (telephone: 202-418-2312) or download from <http://www.usda.gov/cnpp>.

The estimates are provided for the overall United States. The child-rearing expense estimates for husband-wife families are also provided for urban areas in four regions (Northeast, South, Midwest, and West) and rural areas throughout the United States<sup>2</sup> to adjust partially for price differentials and varying patterns of expenditures. For single-parent families, estimates are provided only for the overall United States because of limitations in the sample size. Expenditures on children are estimated for the major budgetary components: Housing, food, transportation, clothing, health care, child care and education, and miscellaneous goods and services. The box describes each expenditure component.

<sup>2</sup>Urban areas are defined as Metropolitan Statistical Areas (MSA's) and other places of 2,500 or more people outside an MSA; rural areas are places of less than 2,500 people outside an MSA.



---

## Categories of Household Expenditures

*Housing expenses* consists of shelter (mortgage interest, property taxes, or rent; maintenance and repairs; and insurance), utilities (gas, electricity, fuel, telephone, and water), and house furnishings and equipment (furniture, floor coverings, major appliances, and small appliances). For homeowners, housing expenses do not include mortgage principal payments; in the Consumer Expenditure Survey, such payments are considered to be part of savings. So, total dollars allocated to housing by homeowners are underestimated in this report.

*Food expenses* consists of food and nonalcoholic beverages purchased at grocery, convenience, and specialty stores, including purchases with food stamps; dining at restaurants; and household expenditures on school meals.

*Transportation expenses* consists of the net outlay on purchase of new and used vehicles, vehicle finance charges, gasoline and motor oil, maintenance and repairs, insurance, and public transportation.

*Clothing expenses* consists of children's apparel such as diapers, shirts, pants, dresses, and suits; footwear; and clothing services such as dry cleaning, alterations and repair, and storage.

*Health care expenses* consists of medical and dental services not covered by insurance, prescription drugs and medical supplies not covered by insurance, and health insurance premiums not paid by employer or other organization.

*Child care and education expenses* consists of day care tuition and supplies; baby-sitting; and elementary and high school tuition, books, and supplies.

*Miscellaneous expenses* consists of personal care items, entertainment, and reading materials.

## Data

The 1990-92 Consumer Expenditure Survey (CE) is used to estimate expenditures on children. Administered by the Bureau of Labor Statistics (BLS), the CE collects information on socio-demographic characteristics, income, and expenditures of households.

The CE has been conducted annually since 1980 and interviews about 5,000 households each quarter over a 1-year period. Each quarter is deemed an independent sample by BLS; thus, the total number of households in the 1990-92 survey is about 60,000.

Husband-wife and single-parent families were selected from these households for this study if (1) they had at least one

child of their own—age 17 or under—in the household, (2) they had six or fewer children, (3) there were no other related or unrelated people present in the household except their own children, and (4) they were complete income reporters. Complete income reporters are households that provide values for major sources of income, such as wages and salaries, self-employment income, and Social Security income. Quarterly expenditures were annualized. The sample consisted of 12,850 husband-wife households and 3,395 single-parent households. BLS weighting methods were used to weight the sample to reflect the U.S. population of interest. Although based on 1990-92 data, the expense estimates were updated to 1999 dollars by using the Consumer Price Index (CPI-U). (Expenditure and income data for 1990

and 1991 were first converted to 1992 dollars; then all 3 years of data were updated to 1999 dollars.)

## Methods

The CE collects overall household expenditure data for some budgetary components (housing, food, transportation, health care, and miscellaneous goods and services) and child-specific expenditure data for other components (clothing, child care, and education). Multivariate analysis was used to estimate household and child-specific expenditures. Income level, family size, and age of the younger child were controlled so that estimates could be made for families with these varying characteristics. Regional estimates were derived by controlling for region.

The three income groups of husband-wife households were determined by dividing the sample for the overall United States into equal thirds. The income groups were before-tax income under \$31,000, between \$31,000 and \$52,160, and over \$52,160 in 1992 dollars.

For each income level, the estimates were for husband-wife families with two children. The younger child was in one of six age categories: 0-2, 3-5, 6-8, 9-11, 12-14, and 15-17. Households with four members (two children) were selected as the standard because in 1990-92 this was the average household size of two-parent families. The focus was on the younger child in a household because the older child was sometimes over age 17.

The estimates are based on CE interviews of households with and without specific expenses; so for some families, expenditures may be higher or lower than the mean estimates, depending on whether they incur the expense. This particularly applies to child care and education for which about 50 percent of families in the study had no expenditure. Also, the estimates only cover out-of-pocket expenditures on children made by the parents and not by others, such as grandparents or friends. For example, the value of clothing gifts to children from grandparents would not be included in clothing expenses.

Regional income categories were based on the national income categories in 1992 dollars, updated to 1999 dollars by using regional CPI's. The regional income categories were not divided into equal thirds for each region as was done for the overall United States.

After the various overall household and child-specific expenditures were estimated, these total amounts were allocated among the four family members (husband, wife, older child, and younger child). The estimated expenditures for clothing and child care and education were only for children. It was assumed that these expenses were equally allocated to each child; therefore, the estimated expenditures were divided by two (the number of children in the household).

Because the CE did not collect expenditures on food and health care by family member, data from other Federal studies were used to apportion these budgetary components to children by age. Food budget shares as a percentage of total food expenditures—for the younger child in a husband-wife household with two children—were determined by using the 1994 USDA food plans (9). These shares were estimated by age of the child and household income level. The food budget shares were then applied to estimated household food expenditures to determine food expenses on children. Health care shares, as a percentage of total health care expenses for the younger child in a husband-wife household with two children, were calculated from the 1987 National Medical Expenditure Survey (4). These shares were estimated by age of the child and applied to estimated household health care expenditures to determine expenses on children.

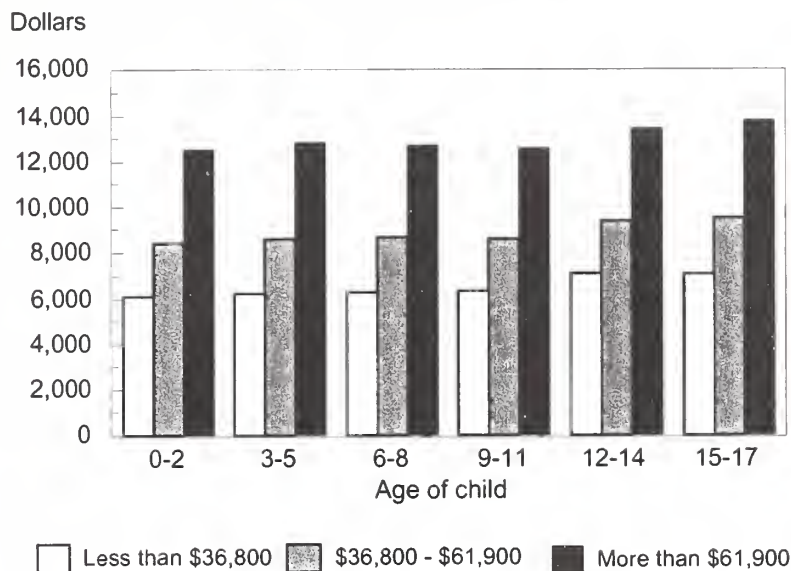
No research base exists for allocating estimated household expenditures on housing, transportation, and miscellaneous goods and services among household members. Two of the most common approaches for allocating these expenses are the marginal cost method and the per capita method.

The marginal cost method measures expenditures on children as the difference in expenses between couples with children and equivalent childless couples. This method depends on development of an equivalency measure; however, there is no universally accepted measure. Proposed methods have produced different estimates of expenditures on children.<sup>3</sup> Some of the marginal cost approaches assume that parents or couples do not alter expenditures on themselves after a child is added to a household. Also, couples without children often buy larger-than-needed homes at the time of purchase in anticipation of children. Comparing the expenditures of childless couples with expenditures of similar couples that have children could lead to underestimated expenditures on children. Lastly, the marginal cost method does not provide a direct estimate of how much is spent on a child. It estimates how much money families with children must be compensated to bring the parents to the same utility level (as gauged by an equivalence scale) of couples without children. This is a different question from "how much do parents spend on children?"

For these reasons, the USDA uses the per capita method to allocate housing, transportation, and miscellaneous goods and services among household members. The per capita method allocates expenses among household members in equal proportions. Although the per capita method has limitations, these limitations were considered less severe than those of the marginal cost approach.

<sup>3</sup>For a review of equivalency measures and estimates of expenditures on children resulting from them, see U.S. Department of Health and Human Services, Office of the Assistant Secretary for Planning and Evaluation, 1990, *Estimates of Expenditures on Children and Child Support Guidelines* (11).

**Figure 1. Estimated 1999 annual family expenditures on a child, by before-tax income level and age of child<sup>1</sup>**



<sup>1</sup>U.S. average for the younger child in husband-wife families with children.

A major limitation of the per capita method is that expenditures for an additional child may be less than average expenditures. Consequently, adjustment formulas were devised to estimate expenditures on one child or three or more children for households of different sizes. These formulas are discussed later in the paper. Transportation expenses resulting from employment activities are not related to expenses on children, so these costs were excluded from the estimated household transportation expenses. Data used to estimate work-related transportation expenses were from a 1990 U.S. Department of Transportation study (12).

Although the USDA uses the per capita approach rather than a marginal cost approach in allocating housing, transportation, and miscellaneous expenditures to children in a household, a USDA study

examined how these expenses would be allocated using different marginal cost approaches (5). These approaches produced estimates of expenditures on children for housing and miscellaneous goods and services below those produced by the per capita method. In addition, these approaches produced estimates of transportation expenditures on children above those produced by the per capita method.

### Estimated Expenditures on Children by Husband-Wife Households

Estimates of family expenditures on the younger child in husband-wife households with two children are presented in tables 2 through 7 on pp. 68-73. The estimates are for the overall United States, urban regions of the country, and overall rural areas. Household income levels were

updated to 1999 dollars by using the all-items category of the CPI-U, and expenditures were updated by using the CPI for the corresponding item (i.e., the CPI's for housing, food, etc.). Regional estimates were updated to 1999 dollars by using the regional CPI's. The following subsections highlight the child-rearing expense estimates for the younger child in a two-child household for the overall United States by income level, budgetary component, and age of the child. Child-rearing expenses by region are also discussed.

### Income Level

Estimated expenses on children vary considerably by household income level (fig. 1). Depending on age of the child, the annual expenses range from \$6,080 to \$7,150 for families in the lowest income group (1999 before-tax income less than \$36,800), from \$8,450 to \$9,530 for families in the middle-income group (1999 before-tax income between \$36,800 and \$61,900), and from \$12,550 to \$13,800 for families in the highest income group (1999 before-tax income more than \$61,900). On average, households in the lowest group spend 28 percent of their before-tax income per year on a child; those in the middle-income group, 18 percent; and those in the highest income group, 14 percent. The range in these percentages would be narrower if after-tax income were considered, because a greater percentage of income in higher income households goes toward taxes.

Although families in the highest income group spend slightly less than twice the amount that families in the lowest income group spend on a child, on average, the amount varies by budgetary component. In general, expenses on a child for goods and services considered to be necessities (such as food and clothing) do not



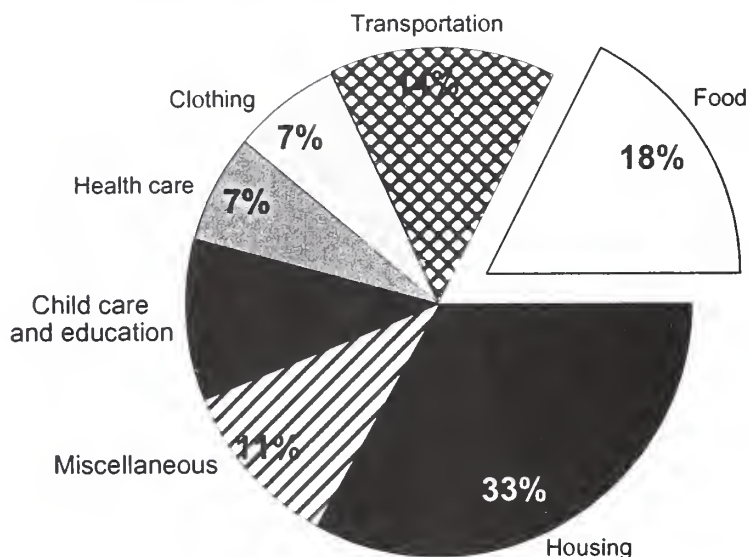
vary as much as those considered to be discretionary (such as miscellaneous expenses) among households in the three income groups. For example, clothing expenses on a child age 15-17 average \$680 in the lowest income group and \$1,030 in the highest income group, a 51-percent difference. Miscellaneous expenses on the same age child average \$630 in the lowest income group and \$1,590 in the highest income group, a 152-percent difference.

### Budgetary Component

Housing accounts for the largest share of total child-rearing expenses; figure 2 shows this for families in the middle-income group. Based on an average for the six age groups, housing accounts for 33 percent of child-rearing expenses for a child in the lowest and middle-income groups and 37 percent in the highest income group. Food is the second largest average expense on a child for families regardless of income level. It accounts for 20 percent of child-rearing expenses for a child in the lowest income group, 18 percent in the middle-income group, and 15 percent in the highest income group. Transportation is the third largest child-rearing expense, making up 13 to 14 percent of child-rearing expenses across income levels.

Across the three income groups, miscellaneous goods and services (personal care items, entertainment, and reading materials) is the fourth largest expense on a child for families (10 to 13 percent). Clothing (excluding that received as gifts or hand-me-downs) accounts for 6 to 8 percent of expenses on a child for families, child care and education accounts for 8 to 11 percent, and health care accounts for 5 to 7 percent of child-rearing expenses across income groups. Estimated expenditures for health care include only out-of-pocket expenses

**Figure 2. Estimated family expenditures on a child through age 17, by budgetary share<sup>1</sup>**



**Total expenditures in 1999 dollars = \$160,140**

<sup>1</sup>U.S. average for the younger child in middle-income (1999 before-tax income between \$36,800 and \$61,900), husband-wife families with two children.

(including insurance premiums not paid by an employer or other organization) and not that portion covered by health insurance.

### Age of Child

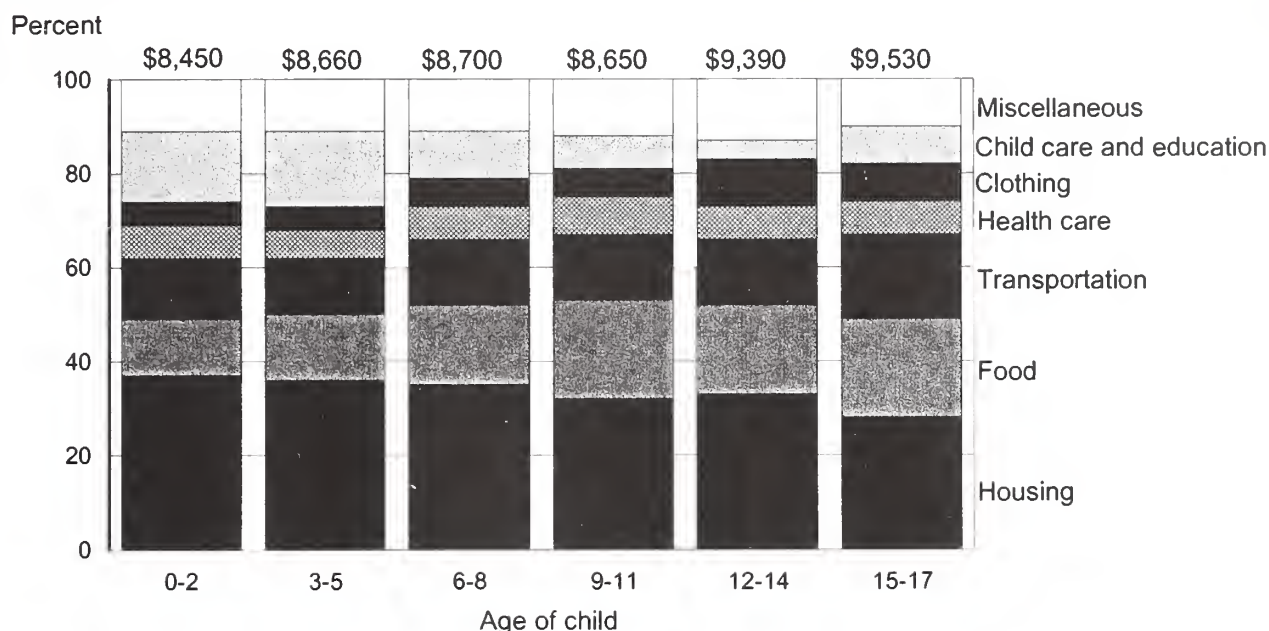
Expenditures on a child are lower in the younger age categories and higher in the older age categories. Figure 3 depicts this for families in the middle-income group. This held across income groups even though housing expenses, the highest child-rearing expenditure, generally decline as the child ages. The decline in housing expenses reflects diminishing interest paid by homeowners over the life of a mortgage. Payments on principal are not considered part of housing costs

in the CE; they are deemed to be part of savings.

For all three income groups, food, transportation, clothing, and health care expenses related to child-rearing generally increase as the child's age increases. Transportation expenses are highest for a child age 15-17, when he or she would start driving. Child care and education expenses are highest for a child under age 6. Most of this expense may be attributable to child care at this age. The estimated expense for child care and education may seem low for those with the expense. It should be remembered that the estimates reflect the average of households with and without the expense.



**Figure 3. Estimated 1999 annual family expenditures on a child, by age and budgetary share<sup>1</sup>**



<sup>1</sup>U.S. average for the younger child in middle-income (1999 before-tax income between \$36,800 and \$61,900), husband-wife families with two children.

## Region

Child-rearing expenses in the regions of the country reflect patterns observed in the overall United States: in each region, expenses on a child increase with household income level and, generally, with age of the child. Overall child-rearing expenses are highest in the urban West, followed by the urban Northeast, and urban South. Figure 4 shows total child-rearing expenses by region and age of a child for middle-income families. Child-rearing expenses are lowest in the urban Midwest and rural areas. Much of the difference in expenses on a child among regions is related to housing costs. Total housing expenses on a child are highest in the urban West and urban Northeast and lowest in rural areas. However, child-rearing transportation expenses are highest for families in rural areas. This likely reflects the longer

traveling distances and the lack of public transportation in these areas.

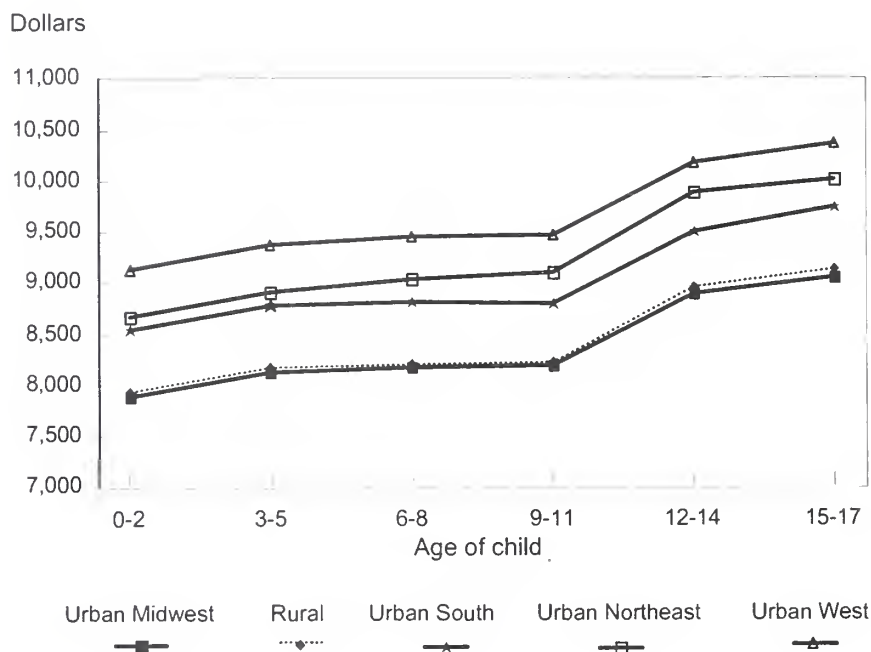
## Adjustments for Older Children and Household Size

The expense estimates on a child represent expenditures on the younger child at various ages in a husband-wife household with two children. It cannot be assumed that expenses on the older child are the same at these various ages. Expenses may vary by birth order. The method described on pp. 57-59 was repeated to determine whether a difference exists, the extent of this difference, and how the expenditures may be adjusted to estimate expenses on an older child. The focus was on the older child in each of the same age categories as those used with the younger child. A two-child family was again used as the

standard. Household income and region of residence were not held constant, so findings are applicable to all families.

On average, for husband-wife households with two children, expenditures do not vary by birth order. So, the expenditures in tables 2 through 7 reflect those on either child in a two-child family. Thus, annual expenditures on children in a husband-wife, two-child family may be estimated by summing the expenses for the two appropriate age categories. For example, annual expenditures on children ages 9-11 and 15-17 in a husband-wife family in the middle-income group for the overall United States would be \$18,180 (\$8,650 + \$9,530). For specific budgetary components, annual expenses on an older child vary, compared with those on a younger child: families spend

**Figure 4. Estimated 1999 annual family expenditures on a child, by region and age<sup>1</sup>**



<sup>1</sup>U.S. average for the younger child in middle-income, husband-wife families with two children. For the urban West, the middle-income group had a 1999 before-tax income between \$36,900 and \$62,000; the urban Northeast, between \$36,500 and \$61,400; for the urban South, between \$36,800 and \$61,900; for the urban Midwest, between \$37,100 and \$62,400; and for rural areas, between \$37,200 and \$62,600.

more on clothing and education for an older child but less on transportation.

The estimates should also be adjusted if a household has only one child or more than two children. Families will spend more or less on a child depending on the number of other children in the household and economies of scale. Multivariate analysis was used to estimate expenditures for each budgetary component to derive these figures. Household size and age of the younger child were controlled; household income level and region of the country were not. The results, therefore, are applicable to all families. These expenditures were then

assigned to a child by using the method described earlier. Compared with expenditures for each child in a husband-wife, two-child family, expenditures for the child in a one-child family average 24 percent more and for those with three or more children, 23 percent less on each child.

Therefore, to adjust the figures in tables 2 through 7 to estimate annual overall expenditures on an only child, users of this report should add 24 percent to the total expense for the child's age category. To estimate expenditures on three or more children, users should subtract 23 percent from the total expense for

each child's age category and then sum the totals. As an example of adjustments needed for different numbers of children, the total expenses for a middle-income family in the overall United States on a child age 15-17 with no siblings would be \$11,820 ( $\$9,530 \times 1.24$ ). The total expenses on three children ages 3-5, 12-14, and 15-17 would be \$21,240 ( $(\$8,660 + \$9,390 + \$9,530) \times .77$ ). For a particular budgetary component, the percentages may be more or less. As family size increases, food costs per child decrease less than housing and transportation costs per child decrease.

### Expenditures by Single-Parent Families

The estimates of expenditures on children by husband-wife families do not apply to single-parent families, a group that accounts for an increasing percentage of families with children. Therefore, separate estimates of child-rearing expenses in single-parent households were made by using the CE data. Most single-parent families in the survey were headed by a woman: 90 percent.

The method used in determining child-rearing expenses for two-parent households was followed. Multivariate analysis was used to estimate expenditures for each budgetary component. Control variables were income level, household size, and age of the younger child (the same age categories as used with children in two-parent families). A single parent with two children was used as the standard for household size.

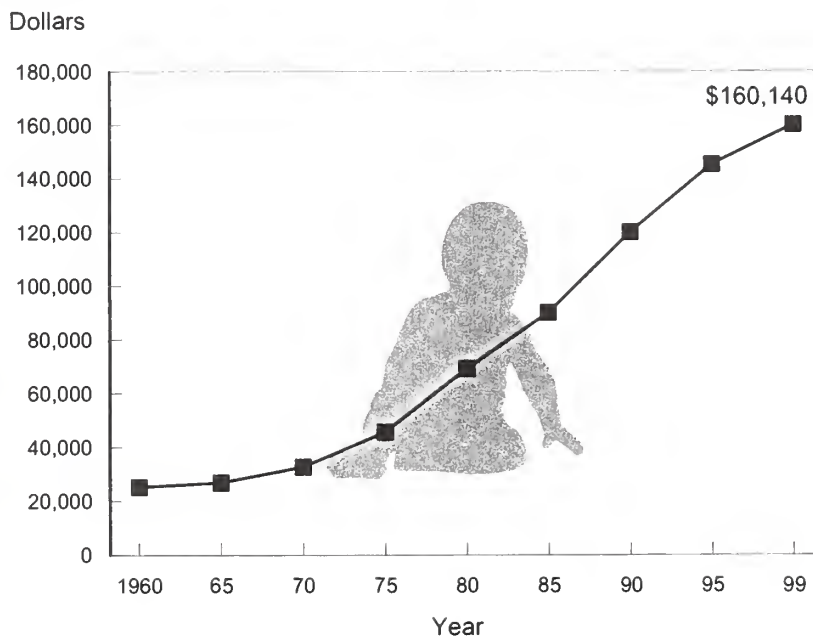
Income groups of single-parent households (before-tax income under \$31,000 and \$31,000 and over in 1992 dollars, inflated to 1999 dollars) were selected to correspond with the income groups

### Expenditures on Children Over Time

Since 1960 the U.S. Department of Agriculture (USDA) has been providing estimates of expenditures on children from birth through age 17. The original estimates were based on the 1960 Consumer Expenditure Survey. The figure below examines how these expenditure estimates have changed over time at 5-year intervals. Depicted are the average total expenditures on a child from birth through age 17 in a middle-income, husband-wife family. Expenditures are in nominal (not adjusted for inflation) dollars.

Expenses to raise a child to age 18 have increased dramatically even when adjusted for inflation, from \$25,230 in 1960 (\$142,000 in 1999 dollars) to \$160,140 in 1999. New components of child-rearing costs, particularly child care, are among factors causing this increase. In 1960 child care expenses were negligible because many mothers were not in the labor force. In 1999 child care expenses were among the largest expenditures made on preschool children by middle-income families.

#### Total expenditures on a child for the first 18 years of life<sup>1</sup>



<sup>1</sup> Average expenditures for a middle-income, husband-wife family, not adjusted for inflation.

## Estimating Future Costs

The estimates presented in this study represent household expenditures on a child of a certain age in 1999. To estimate these expenses for the first 17 years, future price changes need to be incorporated in the figures. To do this, a future cost formula is used such that:

$$C_f = C_p (1 + i)^n$$

where:

$C_f$  = projected future annual dollar expenditure on a child of a particular age

$C_p$  = present (1999) annual dollar expenditure on a child of a particular age

$i$  = projected annual inflation (or deflation)

$n$  = number of years from present until child will reach a particular age

An example of estimated future expenditures on the younger child in a husband-wife family with two children for each of the three income groups for the overall United States is presented.

The example assumes a child is born in 1999 and reaches age 17 in the year 2016. The example also assumes that the average annual inflation rate over this time is 4.3 percent (the average annual inflation rate over the past 20 years) (10). Thus total family expenses on a child through age 17 would be \$174,090, \$236,660, and \$344,800 for households in the lowest, middle, and highest income groups, respectively. In 1999 dollars, these figures would be \$117,390, \$160,140, and \$233,850.

Inflation rates other than 4.3 percent could be used in the formula if projections of these rates vary in the future. Also, it is somewhat unrealistic to assume that households remain in one income category as a child ages. For most families, income rises over time. In addition, such projections assume child-rearing expenditures change only with inflation, but parental expenditure patterns also change over time.

## Estimated annual expenditures on a child born in 1999, by income group<sup>1</sup>

Year	Age	Income group		
		Lowest	Middle	Highest
1999	<1	\$6,080	\$8,450	\$12,550
2000	1	6,340	8,810	13,090
2001	2	6,610	9,190	13,650
2002	3	7,050	9,830	14,570
2003	4	7,350	10,250	15,200
2004	5	7,670	10,690	15,850
2005	6	8,120	11,200	16,360
2006	7	8,470	11,680	17,070
2007	8	8,840	12,180	17,800
2008	9	9,250	12,630	18,400
2009	10	9,640	13,180	19,200
2010	11	10,060	13,740	20,020
2011	12	11,850	15,560	22,290
2012	13	12,360	16,230	23,250
2013	14	12,890	16,930	24,250
2014	15	13,260	17,920	25,950
2015	16	13,830	18,690	27,070
2016	17	14,420	19,500	28,230
Total		\$174,090	\$236,660	\$344,800

<sup>1</sup>Estimates are for the younger child in husband-wife families with two children.



---

used in estimating child-rearing expenditures in husband-wife households. This income includes child support payments. The two higher income groups of two-parent families (income between \$31,000 and \$52,160 and over \$52,160 in 1992 dollars) were combined because only 17 percent of single-parent households had a before-tax income of \$31,000 and over. The sample was weighted to reflect the U.S. population of interest.

Children's clothing and child care and education expenditures were divided between the two children in the one-parent household. For food and health care, household member shares were calculated for a three-member household (single parent and two children, with the younger child in one of the six age categories). The USDA food plans and the 1987 National Medical Expenditure Survey findings were used to do this. These shares for the younger child in a single-parent family were then applied to estimated food and health care expenditures to determine expenses on the younger child in each age category.

Housing, transportation, and miscellaneous expenditures were allocated among household members on a per capita basis. Transportation expenses were adjusted to account for nonemployment-related activities in single-parent families. Income and expenses were updated to 1999 dollars.

Child-rearing expense estimates for single-parent families are in table 8, p. 74. For the lower income group (1999 before-tax income less than \$36,800), a comparison of estimated expenditures on the younger child in a single-parent family with two children with those of the younger child in a husband-wife family with two children is presented in table 1. As discussed earlier, 83 percent

of single-parent families and 33 percent of husband-wife families were in this lower income group. More single-parent than husband-wife families were in the bottom range of this lower income group. Average income for single-parent families in the lower income group is \$15,400; for husband-wife families it is \$23,000. However, total expenditures on a child through age 17 are, on average, only 5 percent lower in single-parent households than in two-parent households.

Single-parent families in this lower income group, therefore, spend a larger proportion of their income on children than do two-parent families. On average, housing expenses are higher; whereas, transportation, health care, child care and education, and miscellaneous expenditures on a child are lower in single-parent than in husband-wife households. Child-related food and clothing expenditures are similar, on average, in single- and two-parent families.

For the higher income group of single-parent families (1999 before-tax income of \$36,800 and over), child-rearing expense estimates are about the same as those for two-parent households in the before-tax income group of \$61,900 and over. Total expenses, in 1999 dollars, for the younger child through age 17 are \$234,780 for single-parent families versus \$233,850 for husband-wife families. Child-rearing expenses for the higher income group of single-parent families, therefore, also are a larger proportion of income than they are in husband-wife families. Thus, expenditures on children do not differ much between single-parent and husband-wife households. What differs is household income levels. Because single-parent families have one less potential earner than do husband-wife families, on average, their total household income is lower,

**Table 1. A comparison of estimated 1999 expenditures on a child by lower income single-parent and husband-wife families<sup>1</sup>**

Age of child	Single-parent households	Husband-wife households
0 - 2	\$5,090	\$6,080
3 - 5	5,770	6,210
6 - 8	6,480	6,310
9 - 11	6,070	6,330
12 - 14	6,540	7,150
15 - 17	7,240	7,050
Total (0 - 17)	\$111,570	\$117,390

<sup>1</sup> Estimates are for the younger child in two-child families in the overall United States with 1999 before-tax income less than \$36,800.

and child-rearing expenses are a greater percentage of this income.

Estimates cover only out-of-pocket child-rearing expenditures made by the parent with primary care of the child and do not include child-related expenditures made by the parent without primary care or made by others, such as grandparents. Such expenditures could not be estimated from the data. Overall expenses by both parents on a child in a single-parent household are likely greater than this study's estimates.

The procedure detailed earlier was repeated to determine the extent of the difference in expenditures on an older child in single-parent households. The focus was on the older child, and a family with two children was used as the standard. On average, single-parent households with two children spend 7 percent less on the older than on the younger child (in addition to age-related differences). This contrasts with husband-wife households whose expenditures are unaffected by birth order.

As with husband-wife households, single-parent households spend more or less if there is only one child or three or more children. Multivariate analysis was used to estimate expenditures for each budgetary component to determine these differences. Household size and age of the younger child were control variables. Expenditures were then assigned to a child by using the method described earlier. Compared with expenditures for the younger child in a single-parent, two-child family, expenditures for an only child in a single-parent household average 35 percent more, and those with three or more children average 28 percent less on each child.

### Other Expenditures on Children

Expenditures on a child that were estimated in this study are composed of direct parental expenses made on a child through age 17 for seven major budgetary components. These direct expenditures exclude costs related to childbirth and prenatal health care. In 1996 these particular health care costs averaged

\$7,090 for a normal delivery and \$11,450 for a Cesarean delivery (7). These costs may be reduced by health insurance. One of the largest expenses made on children after age 17 is the cost of a college education. The College Board (2) estimates that in 1999-2000, average annual tuition and fees are \$3,274 at 4-year public colleges and \$12,894 at 4-year private colleges. Annual room and board is \$4,533 at 4-year public colleges and \$5,224 at 4-year private colleges. For 2-year colleges in 1999-2000, average annual tuition and fees are \$1,608 at public colleges and \$7,744 at private colleges. Annual room and board is \$4,474 at 2-year private colleges. No estimates of room and board are given for 2-year public colleges. Other parental expenses on children after age 17 include those associated with children living at home or, if children do not live at home, gifts and other contributions to them.

The estimates do not include all government expenditures on children. Examples of excluded expenses are public education, Medicaid, and school meals. The actual expenditures on children (by parents and the government) would be higher than reported in this study, especially for the lowest income group.

Indirect child-rearing costs are also not included in the estimates. Although these costs are typically more difficult to measure than are direct expenditures, they can be substantial. The time involved in rearing children is considerable. In addition, one or both parents may need to cut back on hours spent in the labor force to care for children, thus reducing current earnings and future career opportunities. The indirect costs of child rearing may exceed the direct costs. For more on these indirect costs, see Bryant et al. (1), Ireland and Ward (3), Longman (6), and Spalter-Roth and Hartmann (8).

---

## References

1. Bryant, W.K., Zick, C.D., and Kim, H. 1992. *The Dollar Value of Household Work*. College of Human Ecology, Cornell University, Ithaca, NY.
2. The College Board. 1999. *Trends in College Pricing 1999*. [On-line]. Available: [www.collegeboard.org](http://www.collegeboard.org).
3. Ireland, T.R. and Ward, J.O. 1995. *Valuing Children in Litigation: Family and Individual Loss Assessment*. Lawyers and Judges Publishing Company, Inc., Tucson, AZ.
4. Lefkowitz, D. and Monheit, A. 1991. *Health Insurance, Use of Health Services, and Health Care Expenditures*. National Medical Expenditure Survey Research Findings 12. U.S. Department of Health and Human Services, Public Health Service, Agency for Health Care Policy and Research Publication No. 92-0017.
5. Lino, M. and Johnson, D.S. 1995. Housing, transportation, and miscellaneous expenditures on children: A comparison of methodologies. *Family Economics Review* 8(1):2-12.
6. Longman, P.J. 1998 (March 30). The Cost of Children. *U.S. News & World Report* 124(12):50-58.
7. Mushinski, M. 1998. Average charges for uncomplicated vaginal, Cesarean and VBAC deliveries: Regional variations, United States, 1996. *Statistical Bulletin* 79(3):17-28.
8. Spalter-Roth, R.M. and Hartmann, H.I. 1990. *Unnecessary Losses: Costs to Americans of the Lack of Family and Medical Leave*. Institute for Women's Policy Research, Washington, DC.
9. U.S. Department of Agriculture, Agricultural Research Service. 1994. Cost of food at home. *Family Economics Review* 7(4):45.
10. U.S. Department of Commerce, Bureau of the Census. 1999. *Statistical Abstract of the United States, 1999*. [119th ed.]
11. U.S. Department of Health and Human Services, Office of the Assistant Secretary for Planning and Evaluation. 1990. *Estimates of Expenditures on Children and Child Support Guidelines*.
12. U.S. Department of Transportation, Federal Highway Administration. 1994. *1990 Nationwide Personal Transportation Study*.

**Table 2. Estimated annual expenditures\* on a child by husband-wife families, overall United States, 1999**

Age of Child	Total	Housing	Food	Transportation	Clothing	Health care	Child care and education	Miscellaneous <sup>†</sup>
<b>Before-tax income: Less than \$36,800 (Average=\$23,000)</b>								
0 - 2	\$6,080	\$2,320	\$860	\$730	\$380	\$430	\$760	\$600
3 - 5	6,210	2,290	960	700	370	410	860	620
6 - 8	6,310	2,210	1,240	820	410	470	510	650
9 - 11	6,330	2,000	1,480	890	460	510	310	680
12 - 14	7,150	2,230	1,560	1,000	770	510	220	860
15 - 17	7,050	1,800	1,680	1,350	680	550	360	630
Total	\$117,390	\$38,550	\$23,340	\$16,470	\$9,210	\$8,640	\$9,060	\$12,120
<b>Before-tax income: \$36,800 to \$61,900 (Average=\$49,000)</b>								
0 - 2	\$8,450	\$3,140	\$1,030	\$1,090	\$450	\$560	\$1,250	\$930
3 - 5	8,660	3,110	1,190	1,060	440	530	1,380	950
6 - 8	8,700	3,030	1,520	1,180	480	610	890	990
9 - 11	8,650	2,820	1,790	1,250	530	660	580	1,020
12 - 14	9,390	3,050	1,800	1,360	900	670	420	1,190
15 - 17	9,530	2,620	2,000	1,720	800	700	730	960
Total	\$160,140	\$53,310	\$27,990	\$22,980	\$10,800	\$11,190	\$15,750	\$18,120
<b>Before-tax income: More than \$61,900 (Average=\$92,700)</b>								
0 - 2	\$12,550	\$4,990	\$1,370	\$1,520	\$590	\$640	\$1,880	\$1,560
3 - 5	12,840	4,960	1,550	1,500	580	620	2,050	1,580
6 - 8	12,710	4,880	1,870	1,610	630	700	1,410	1,610
9 - 11	12,600	4,670	2,170	1,680	690	760	980	1,650
12 - 14	13,450	4,900	2,280	1,800	1,140	760	750	1,820
15 - 17	13,800	4,470	2,400	2,180	1,030	800	1,330	1,590
Total	\$233,850	\$86,610	\$34,920	\$30,870	\$13,980	\$12,840	\$25,200	\$29,430

\*Estimates are based on 1990-92 Consumer Expenditure Survey data updated to 1999 dollars using the Consumer Price Index. For each age category, the expense estimates represent average child-rearing expenditures for each age (e.g., the expense for the 3-5 age category, on average, applies to the 3-year-old, the 4-year-old, or the 5-year-old). The figures represent estimated expenses on the younger child in a two-child family. Estimates are about the same for the older child, so to calculate expenses for two children, figures should be summed for the appropriate age categories. To estimate expenses for an only child, multiply the total expense for the appropriate age category by 1.24. To estimate expenses for each child in a family with three or more children, multiply the total expense for each appropriate age category by 0.77. For expenses on all children in a family, these totals should be summed.

<sup>†</sup>Miscellaneous expenses include personal care items, entertainment, and reading materials.



**Table 3. Estimated annual expenditures\* on a child by husband-wife families, urban West,<sup>†</sup> 1999**

Age of Child	Total	Housing	Food	Transportation	Clothing	Health care	Child care and education	Miscellaneous <sup>‡</sup>
<b>Before-tax income: Less than \$36,900 (Average=\$23,000)</b>								
0 - 2	\$6,740	\$2,820	\$950	\$800	\$360	\$360	\$750	\$700
3 - 5	6,890	2,800	1,050	780	350	340	850	720
6 - 8	7,050	2,760	1,350	890	400	390	500	760
9 - 11	7,160	2,610	1,620	960	440	430	300	800
12 - 14	7,930	2,800	1,690	1,080	740	440	210	970
15 - 17	7,860	2,400	1,830	1,420	650	460	360	740
Total	\$130,890	\$48,570	\$25,470	\$17,790	\$8,820	\$7,260	\$8,910	\$14,070
<b>Before-tax income: \$36,900 to \$62,000 (Average=\$49,100)</b>								
0 - 2	\$9,140	\$3,630	\$1,120	\$1,180	\$430	\$490	\$1,250	\$1,040
3 - 5	9,370	3,610	1,280	1,150	420	470	1,380	1,060
6 - 8	9,450	3,570	1,640	1,260	470	530	890	1,090
9 - 11	9,470	3,410	1,930	1,330	520	570	580	1,130
12 - 14	10,170	3,600	1,940	1,450	870	580	430	1,300
15 - 17	10,360	3,210	2,150	1,810	770	610	730	1,080
Total	\$173,880	\$63,090	\$30,180	\$24,540	\$10,440	\$9,750	\$15,780	\$20,100
<b>Before-tax income: More than \$62,000 (Average=\$92,900)</b>								
0 - 2	\$13,110	\$5,370	\$1,440	\$1,620	\$560	\$570	\$1,900	\$1,650
3 - 5	13,410	5,350	1,630	1,600	550	550	2,060	1,570
6 - 8	13,340	5,310	1,960	1,700	610	630	1,420	1,710
9 - 11	13,270	5,150	2,290	1,770	660	670	990	1,740
12 - 14	14,070	5,340	2,390	1,890	1,090	680	770	1,910
15 - 17	14,470	4,950	2,520	2,270	990	710	1,340	1,690
Total	\$245,010	\$94,410	\$36,690	\$32,550	\$13,380	\$11,430	\$25,440	\$31,110

\*Estimates are based on 1990-92 Consumer Expenditure Survey data updated to 1999 dollars using the regional Consumer Price Index. For each age category, the expense estimates represent average child-rearing expenditures for each age (e.g., the expense for the 3-5 age category, on average, applies to the 3-year-old, the 4-year-old, or the 5-year-old). The figures represent estimated expenses on the younger child in a two-child family. Estimates are about the same for the older child, so to calculate expenses for two children, figures should be summed for the appropriate age categories. To estimate expenses for an only child, multiply the total expense for the appropriate age category by 1.24. To estimate expenses for each child in a family with three or more children, multiply the total expense for each appropriate age category by 0.77. For expenses on all children in a family, these totals should be summed.

<sup>†</sup>The Western region consists of Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.

<sup>‡</sup>Miscellaneous expenses include personal care items, entertainment, and reading materials.

**Table 4. Estimated annual expenditures\* on a child by husband-wife families, urban Northeast,<sup>†</sup> 1999**

Age of Child	Total	Housing	Food	Transportation	Clothing	Health care	Child care and education	Miscellaneous <sup>‡</sup>
<b>Before-tax income: Less than \$36,500 (Average=\$22,800)</b>								
0 - 2	\$6,380	\$2,760	\$970	\$600	\$410	\$420	\$630	\$590
3 - 5	6,510	2,740	1,070	580	400	400	710	610
6 - 8	6,710	2,710	1,370	690	440	450	410	640
9 - 11	6,830	2,550	1,630	750	490	490	240	680
12 - 14	7,690	2,740	1,700	880	840	500	170	860
15 - 17	7,570	2,350	1,840	1,210	740	520	280	630
Total	\$125,070	\$47,550	\$25,740	\$14,130	\$9,960	\$8,340	\$7,320	\$12,030
<b>Before-tax income: \$36,500 to \$61,400 (Average=\$48,600)</b>								
0 - 2	\$8,670	\$3,550	\$1,130	\$970	\$480	\$550	\$1,070	\$920
3 - 5	8,910	3,530	1,290	950	470	530	1,190	950
6 - 8	9,040	3,490	1,640	1,060	520	610	740	980
9 - 11	9,100	3,340	1,930	1,120	570	650	470	1,020
12 - 14	9,890	3,530	1,940	1,250	970	660	350	1,190
15 - 17	10,010	3,140	2,150	1,600	870	690	590	970
Total	\$166,860	\$61,740	\$30,240	\$20,850	\$11,640	\$11,070	\$13,230	\$18,090
<b>Before-tax income: More than \$61,400 (Average=\$92,000)</b>								
0 - 2	\$12,580	\$5,250	\$1,440	\$1,410	\$620	\$650	\$1,660	\$1,550
3 - 5	12,860	5,230	1,620	1,390	610	620	1,820	1,570
6 - 8	12,850	5,200	1,960	1,500	660	710	1,220	1,600
9 - 11	12,830	5,040	2,280	1,570	720	750	830	1,640
12 - 14	13,740	5,230	2,380	1,690	1,210	770	640	1,820
15 - 17	13,990	4,840	2,510	2,060	1,100	790	1,100	1,590
Total	\$236,550	\$92,370	\$36,570	\$28,860	\$14,760	\$12,870	\$21,810	\$29,310

\*Estimates are based on 1990-92 Consumer Expenditure Survey data updated to 1999 dollars using the regional Consumer Price Index. For each age category, the expense estimates represent average child-rearing expenditures for each age (e.g., the expense for the 3-5 age category, on average, applies to the 3-year-old, the 4-year-old, or the 5-year-old). The figures represent estimated expenses on the younger child in a two-child family. Estimates are about the same for the older child, so to calculate expenses for two children, figures should be summed for the appropriate age categories. To estimate expenses for an only child, multiply the total expense for the appropriate age category by 1.24. To estimate expenses for each child in a family with three or more children, multiply the total expense for each appropriate age category by 0.77. For expenses on all children in a family, these totals should be summed.

<sup>†</sup>The Northeast region consists of Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont.

<sup>‡</sup>Miscellaneous expenses include personal care items, entertainment, and reading materials.

**Table 5. Estimated annual expenditures\* on a child by husband-wife families, urban South,<sup>†</sup> 1999**

Age of Child	Total	Housing	Food	Transportation	Clothing	Health care	Child care and education	Miscellaneous <sup>‡</sup>
<b>Before-tax income: Less than \$36,800 (Average=\$23,000)</b>								
0 - 2	\$6,120	\$2,270	\$830	\$720	\$410	\$470	\$850	\$570
3 - 5	6,270	2,250	930	700	400	450	950	590
6 - 8	6,380	2,210	1,210	800	440	520	570	630
9 - 11	6,450	2,050	1,460	870	490	560	350	670
12 - 14	7,240	2,240	1,530	990	820	570	250	840
15 - 17	7,180	1,850	1,660	1,330	720	590	420	610
Total	\$118,920	\$38,610	\$22,860	\$16,230	\$9,840	\$9,480	\$10,170	\$11,730
<b>Before-tax income: \$36,800 to \$61,900 (Average=\$48,900)</b>								
0 - 2	\$8,540	\$3,070	\$1,000	\$1,080	\$480	\$620	\$1,380	\$910
3 - 5	8,780	3,050	1,160	1,060	470	590	1,520	930
6 - 8	8,820	3,010	1,490	1,170	520	680	990	960
9 - 11	8,800	2,850	1,770	1,240	570	720	650	1,000
12 - 14	9,510	3,040	1,770	1,360	950	730	490	1,170
15 - 17	9,740	2,650	1,980	1,710	850	760	840	950
Total	\$162,570	\$53,010	\$27,510	\$22,860	\$11,520	\$12,300	\$17,610	\$17,760
<b>Before-tax income: More than \$61,900 (Average=\$92,700)</b>								
0 - 2	\$12,540	\$4,790	\$1,320	\$1,520	\$620	\$720	\$2,050	\$1,520
3 - 5	12,850	4,770	1,500	1,500	610	690	2,230	1,550
6 - 8	12,740	4,740	1,810	1,600	670	780	1,560	1,580
9 - 11	12,650	4,580	2,120	1,670	730	830	1,100	1,620
12 - 14	13,460	4,770	2,220	1,790	1,190	840	860	1,790
15 - 17	13,920	4,380	2,350	2,160	1,080	870	1,510	1,570
Total	\$234,480	\$84,090	\$33,960	\$30,720	\$14,700	\$14,190	\$27,930	\$28,890

\*Estimates are based on 1990-92 Consumer Expenditure Survey data updated to 1999 dollars using the regional Consumer Price Index. For each age category, the expense estimates represent average child-rearing expenditures for each age (e.g., the expense for the 3-5 age category, on average, applies to the 3-year-old, the 4-year-old, or the 5-year-old). The figures represent estimated expenses on the younger child in a two-child family. Estimates are about the same for the older child, so to calculate expenses for two children, figures should be summed for the appropriate age categories. To estimate expenses for an only child, multiply the total expense for the appropriate age category by 1.24. To estimate expenses for each child in a family with three or more children, multiply the total expense for each appropriate age category by 0.77. For expenses on all children in a family, these totals should be summed.

<sup>†</sup>The Southern region consists of Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia.

<sup>‡</sup>Miscellaneous expenses include personal care items, entertainment, and reading materials.

**Table 6. Estimated annual expenditures\* on a child by husband-wife families, urban Midwest,<sup>†</sup> 1999**

Age of Child	Total	Housing	Food	Transportation	Clothing	Health care	Child care and education	Miscellaneous <sup>‡</sup>
<b>Before-tax income: Less than \$37,100 (Average=\$23,100)</b>								
0 - 2	\$5,510	\$2,060	\$790	\$640	\$350	\$390	\$740	\$540
3 - 5	5,660	2,040	890	620	340	370	840	560
6 - 8	5,780	2,000	1,150	730	380	420	500	600
9 - 11	5,860	1,840	1,400	800	420	460	300	640
12 - 14	6,630	2,030	1,470	930	710	470	210	810
15 - 17	6,560	1,640	1,600	1,270	630	490	350	580
Total	\$108,000	\$34,830	\$21,900	\$14,970	\$8,490	\$7,800	\$8,820	\$11,190
<b>Before-tax income: \$37,100 to \$62,400 (Average=\$49,300)</b>								
0 - 2	\$7,890	\$2,860	\$960	\$1,020	\$410	\$520	\$1,240	\$880
3 - 5	8,130	2,840	1,120	1,000	400	500	1,370	900
6 - 8	8,170	2,800	1,430	1,110	450	570	880	930
9 - 11	8,190	2,650	1,710	1,180	500	610	570	970
12 - 14	8,890	2,840	1,710	1,300	840	630	420	1,150
15 - 17	9,050	2,440	1,920	1,660	740	650	720	920
Total	\$150,960	\$49,290	\$26,550	\$21,810	\$10,020	\$10,440	\$15,600	\$17,250
<b>Before-tax income: More than \$62,400 (Average=\$93,300)</b>								
0 - 2	\$11,890	\$4,600	\$1,280	\$1,470	\$540	\$620	\$1,880	\$1,500
3 - 5	12,180	4,580	1,460	1,450	530	590	2,050	1,520
6 - 8	12,060	4,540	1,760	1,550	580	670	1,410	1,550
9 - 11	11,990	4,380	2,070	1,620	640	720	970	1,590
12 - 14	12,800	4,570	2,160	1,750	1,060	730	760	1,770
15 - 17	13,180	4,180	2,290	2,130	960	760	1,320	1,540
Total	\$222,300	\$80,550	\$33,060	\$29,910	\$12,930	\$12,270	\$25,170	\$28,410

\*Estimates are based on 1990-92 Consumer Expenditure Survey data updated to 1999 dollars using the regional Consumer Price Index. For each age category, the expense estimates represent average child-rearing expenditures for each age (e.g., the expense for the 3-5 age category, on average, applies to the 3-year-old, the 4-year-old, or the 5-year-old). The figures represent estimated expenses on the younger child in a two-child family. Estimates are about the same for the older child, so to calculate expenses for two children, figures should be summed for the appropriate age categories. To estimate expenses for an only child, multiply the total expense for the appropriate age category by 1.24. To estimate expenses for each child in a family with three or more children, multiply the total expense for each appropriate age category by 0.77. For expenses on all children in a family, these totals should be summed.

<sup>†</sup>The Midwest region consists of Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin.

<sup>‡</sup>Miscellaneous expenses include personal care items, entertainment, and reading materials.



**Table 7. Estimated annual expenditures\* on a child by husband-wife families, Rural areas,<sup>†</sup> 1999**

Age of Child	Total	Housing	Food	Transportation	Clothing	Health care	Child care and education	Miscellaneous <sup>‡</sup>
<b>Before-tax income: Less than \$37,200 (Average=\$23,200)</b>								
0 - 2	\$5,540	\$1,720	\$810	\$830	\$370	\$470	\$760	\$580
3 - 5	5,680	1,700	910	810	360	450	850	600
6 - 8	5,800	1,660	1,170	910	410	510	500	640
9 - 11	5,890	1,500	1,420	980	460	550	300	680
12 - 14	6,700	1,690	1,490	1,110	770	570	220	850
15 - 17	6,620	1,300	1,620	1,450	680	590	360	620
Total	\$108,690	\$28,710	\$22,260	\$18,270	\$9,150	\$9,420	\$8,970	\$11,910
<b>Before-tax income: \$37,200 to \$62,600 (Average=\$49,500)</b>								
0 - 2	\$7,930	\$2,520	\$980	\$1,200	\$440	\$620	\$1,250	\$920
3 - 5	8,170	2,500	1,140	1,180	430	590	1,390	940
6 - 8	8,200	2,460	1,450	1,280	480	670	890	970
9 - 11	8,230	2,310	1,730	1,350	530	720	580	1,010
12 - 14	8,960	2,500	1,730	1,480	900	730	430	1,190
15 - 17	9,140	2,100	1,940	1,840	800	760	740	960
Total	\$151,890	\$43,170	\$26,910	\$24,990	\$10,740	\$12,270	\$15,840	\$17,970
<b>Before-tax income: More than \$62,600 (Average=\$93,700)</b>								
0 - 2	\$11,930	\$4,260	\$1,300	\$1,640	\$580	\$710	\$1,900	\$1,540
3 - 5	12,220	4,240	1,470	1,620	570	690	2,070	1,560
6 - 8	12,130	4,210	1,780	1,720	620	780	1,420	1,600
9 - 11	12,070	4,050	2,090	1,790	680	830	990	1,640
12 - 14	12,910	4,240	2,190	1,920	1,140	840	770	1,810
15 - 17	13,270	3,850	2,310	2,290	1,030	870	1,340	1,580
Total	\$223,590	\$74,550	\$33,420	\$32,940	\$13,860	\$14,160	\$25,470	\$29,190

\*Estimates are based on 1990-92 Consumer Expenditure Survey data updated to 1999 dollars using the population size Consumer Price Index. For each age category, the expense estimates represent average child-rearing expenditures for each age (e.g., the expense for the 3-5 age category, on average, applies to the 3-year-old, the 4-year-old, or the 5-year-old). The figures represent estimated expenses on the younger child in a two-child family. Estimates are about the same for the older child, so to calculate expenses for two children, figures should be summed for the appropriate age categories. To estimate expenses for an only child, multiply the total expense for the appropriate age category by 1.24. To estimate expenses for each child in a family with three or more children, multiply the total expense for each appropriate age category by 0.77. For expenses on all children in a family, these totals should be summed.

<sup>†</sup>Rural areas are places of fewer than 2,500 people outside a Metropolitan Statistical Area.

<sup>‡</sup>Miscellaneous expenses include personal care items, entertainment, and reading materials.

**Table 8. Estimated annual expenditures\* on a child by single-parent families, overall United States, 1999**

Age of Child	Total	Housing	Food	Transportation	Clothing	Health care	Child care and education	Miscellaneous <sup>†</sup>
<b>Before-tax income: Less than \$36,800 (Average=\$15,400)</b>								
0 - 2	\$5,090	\$2,080	\$950	\$680	\$340	\$210	\$470	\$360
3 - 5	5,770	2,370	1,010	600	360	300	650	480
6 - 8	6,480	2,510	1,270	690	430	350	590	640
9 - 11	6,070	2,420	1,470	500	430	450	280	520
12 - 14	6,540	2,420	1,470	580	730	480	360	500
15 - 17	7,240	2,560	1,600	910	850	470	270	580
Total	\$111,570	\$43,080	\$23,310	\$11,880	\$9,420	\$6,780	\$7,860	\$9,240
<b>Before-tax income: \$36,800 or more (Average=\$55,900)</b>								
0 - 2	\$11,680	\$4,480	\$1,480	\$2,080	\$490	\$470	\$1,170	\$1,510
3 - 5	12,550	4,770	1,560	2,000	510	630	1,460	1,620
6 - 8	13,340	4,910	1,870	2,090	590	720	1,370	1,790
9 - 11	12,880	4,810	2,250	1,900	590	870	800	1,660
12 - 14	13,690	4,820	2,210	1,980	980	920	1,140	1,640
15 - 17	14,120	4,960	2,340	2,140	1,120	910	930	1,720
Total	\$234,780	\$86,250	\$35,130	\$36,570	\$12,840	\$13,560	\$20,610	\$29,820

\*Estimates are based on 1990-92 Consumer Expenditure Survey data updated to 1999 dollars using the Consumer Price Index. For each age category, the expense estimates represent average child-rearing expenditures for each age (e.g., the expense for the 3-5 age category, on average, applies to the 3-year-old, the 4-year-old, or the 5-year-old). The figures represent estimated expenses on the younger child in a single-parent, two-child family. For estimated expenses on the older child, multiply the total expense for the appropriate age category by 0.93. To estimate expenses for two children, the expenses on the younger child and older child—after adjusting the expense on the older child downward—should be summed for the appropriate age categories. To estimate expenses for an only child, multiply the total expense for the appropriate age category by 1.35. To estimate expenses for each child in a family with three or more children, multiply the total expense for each appropriate age category by 0.72—after adjusting the expenses on the older children downward. For expenses on all children in a family, these totals should be summed.

<sup>†</sup>Miscellaneous expenses include personal care items, entertainment, and reading materials.

## Insight 2

April 1997

The following are reprinted *Nutrition Insights*, a publication of the Center for Nutrition Policy and Promotion.

Alyson Escobar  
Center for Nutrition Policy  
and Promotion

# Are All Food Pyramids Created Equal?

## *Public Confusion Over Healthy Eating*

In a consumer survey, three of four Americans said there is too much conflicting information about diet (*How are Americans Making Food Choices?* ADA/IFIC, 1994).

Contributing to this confusion are several dietary pyramids that have begun to compete for the public's attention: The USDA Food Guide Pyramid (see graphic below), the Mediterranean Pyramid, the Asian Pyramid, and the Latin American Pyramid, among others. What do these pyramids, all with seemingly different messages, mean for the American

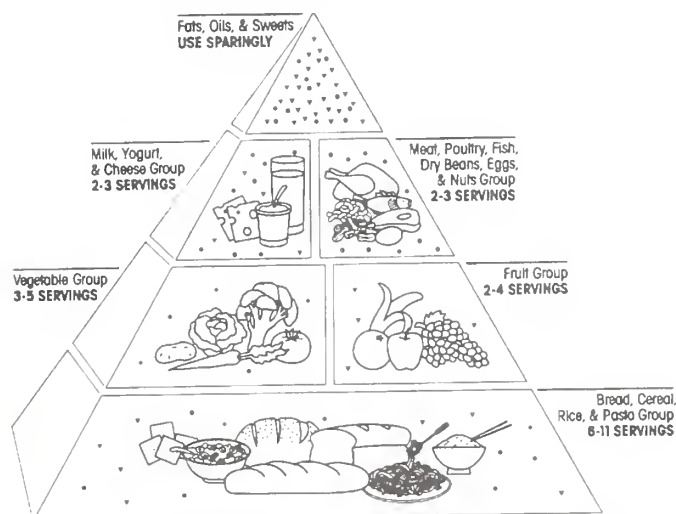
consumer? So the question is, **Are all food pyramids created equal?**

## *USDA Pyramid is Well Known*

Sixty percent of Americans are familiar with the USDA Food Guide Pyramid. The USDA Food Guide Pyramid and the *Dietary Guidelines for Americans* are key components of USDA's food and nutrition guidance system.

The 1995 *Dietary Guidelines for Americans* provide nutrition guidance for healthy Americans 2 years of age and older. The Food Guide Pyramid helps consumers implement the Guidelines by suggesting types and amounts of foods for people of different ages and sexes.

**USDA Food Guide Pyramid**



## Nutrition Insights

### 1. What are the Mediterranean, Asian, and Latin American Diet Pyramids?

The Mediterranean, Asian, and Latin American Diet Pyramids were produced by Oldways Preservation and Exchange Trust of Cambridge, Massachusetts. Oldways, a nonprofit company, developed these diet pyramids to illustrate traditional diets of cultures that epidemiological studies have associated with good health.

### 2. What, if anything, do the USDA Food Guide Pyramid and the Oldways Diet Pyramids have in common?

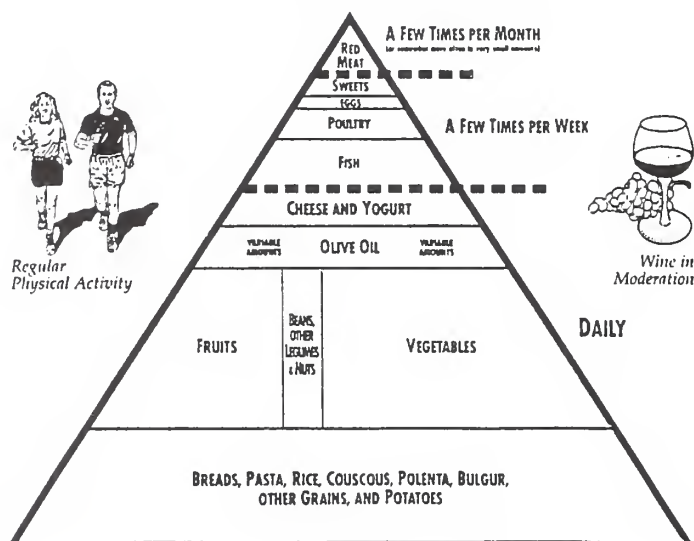
USDA's Food Guide Pyramid and the Oldways Diet Pyramids have much in common. All illustrate eating patterns consistent with current nutritional recommendations, and each can be used to plan diets consisting of different food items. Common emphases of all three Pyramids include eating plenty of grain products and vegetables and fruits.

Physical activity, moderation in consumption of alcoholic beverages, and enjoyment of meals are healthy lifestyle factors emphasized by the Oldways Pyramids and the *Dietary Guidelines for Americans*.

USDA's Food Guide Pyramid is based on American eating patterns. Flexibility in food choices is an important objective of the USDA Food Guide. Thus, a person can easily choose to eat "Mediterranean," "Asian," or "Latin American style" within the framework of the USDA Food Pyramid.

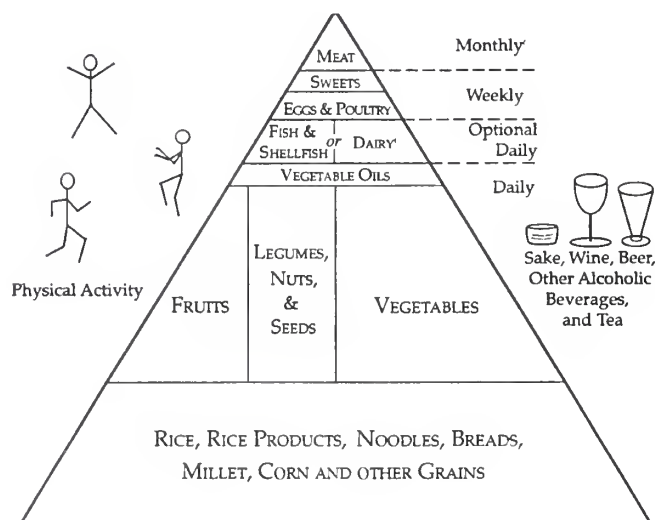
In fact, several other pyramids have been developed. The Puerto Rican Pyramid, the Vegetarian Pyramid, and the "Soul Food" Pyramid all use the USDA Food Guide Pyramid framework but emphasize

## Mediterranean Diet Pyramid



©Copyright 1994 Oldways Preservation & Exchange Trust.

## Asian Diet Pyramid



©1995 Oldways Preservation & Exchange Trust.



---

a more selective range of foods. These pyramids, used in conjunction with the guidance offered by USDA, can help the public choose foods that fit a specific ethnic or cultural diet.

### **3. How do the Oldways Diet Pyramids differ from the USDA Food Guide Pyramid?**

The Oldways Diet Pyramids were designed to illustrate proportions rather than specific types and amounts of food. Detailed information on serving sizes and numbers of servings of foods are not provided. In addition, levels of total fat and saturated fat are not specified.

Since they represent cultural eating patterns, the Oldways Pyramids include a more limited range of foods than the USDA Food Guide Pyramid. A major difference between the Mediterranean and Asian Diet Pyramids and the USDA Food Guide Pyramid is their distinction between plant and animal proteins. The Oldways Pyramids group plant-based proteins—legumes, soybeans, nuts, and seeds—separately from animal proteins found in meat, poultry, eggs, and dairy products.

Red meat is included only occasionally in both the Mediterranean and Asian Pyramids (a few times a month or less), while poultry and eggs appear slightly more often. The Asian Diet Pyramid contains limited dairy products, considering them “optional” and to be eaten in their lowfat forms only. Another important distinction among the Pyramids concerns fat. Fat in the Oldways Pyramids comes largely from vegetable oils high in monounsaturated fats, such as olive oil in the Mediterranean Pyramid and peanut oil in the Asian.

### **4. How can consumers use the USDA and Oldways Pyramids to make healthy food choices?**

Neither USDA’s Food Guide Pyramid nor the Oldways Pyramids can convey all that consumers need to know to make food choices for a healthy diet. USDA’s Food Guide Pyramid is accompanied by additional information, such as the number of servings from each food group appropriate for people of different age, sex, and calorie needs.

To help consumers become healthier, USDA is participating in **The Dietary Guidelines Alliance**, a public-private partnership of health organizations, food industry associations, and the Federal Government. The mission is to motivate consumers to change their eating and activity patterns by providing them with positive, simple messages based on Dietary Guidelines principles.

In 1996, the Alliance kicked off its “It’s All About You” campaign to help consumers integrate Dietary Guidelines principles into their day-to-day lives. For more information, contact the International Food Information Council, 1100 Connecticut Avenue, NW, Suite 430, Washington, DC 20036, and ask for *Reaching Consumers with Meaningful Health Messages: A Handbook for Nutrition and Food Communicators*. The Handbook will be available on the IFIC Web site in May at <http://ificinfo.health.org>.

The USDA Food Guide Pyramid (HG-252) is available on the CNPP Web site at <http://www.usda.gov/fcs/cnpp.htm> and is also available in bulk quantities from the Government Printing Office (202) 512-1800.

Insight 9  
October 1998

## Report Card on the Diet Quality of Children

Mark Lino  
Shirley A. Gerrior  
P. Peter Basiotis  
Rajen S. Anand

Center for Nutrition Policy  
and Promotion

The diet quality of children and adolescents steadily declines as they get older. This decline in diet quality is a concern—poor eating patterns established in childhood usually transfer to adulthood. Such patterns, as well as inactivity among American children, are major factors in the increasing rate of obesity over the past decades. This *Nutrition Insight* uses the Healthy Eating Index (HEI) to examine the diet of American children ages 2 to 18 to identify the components of their diet that contribute to this deterioration. Data used for analysis are from the U.S. Department of Agriculture's (USDA) 1994-96 Continuing Survey of Food Intakes by Individuals, a nationally representative survey containing information on the diets of about 5,000 children.

### ***Healthy Eating Index: How It Is Computed***

The HEI, computed on a regular basis by USDA, is a summary measure of people's diet quality. The HEI provides an overall picture of the type and quantity of foods people eat, their compliance with specific dietary recommendations, and the variety in their diets. The Index consists of 10 components, each representing different aspects of a healthful diet.

Components 1-5 measure the degree to which a person's diet conforms to USDA's Food Guide Pyramid serving

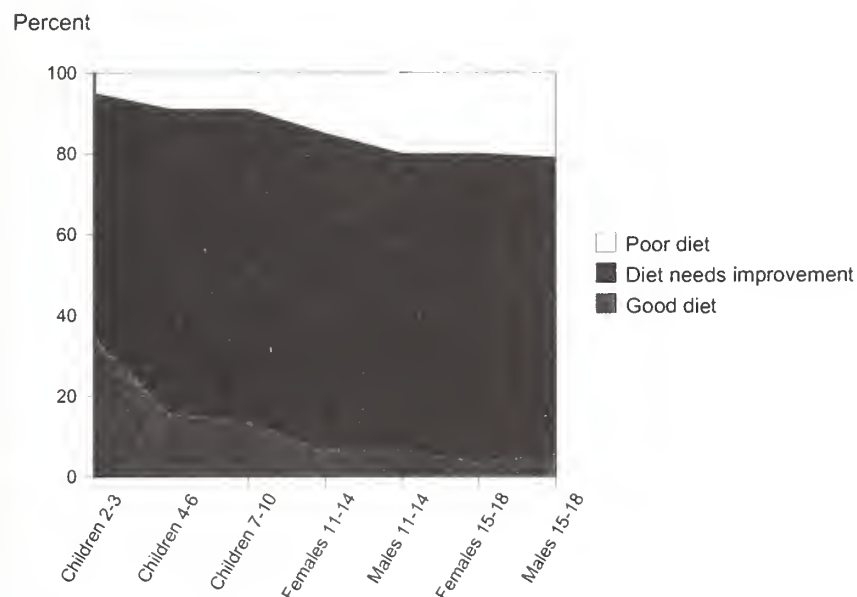
recommendations for the five major food groups: Grains (bread, cereal, rice, and pasta), vegetables, fruits, milk (milk, yogurt, and cheese), and meat (meat, poultry, fish, dry beans, eggs, and nuts). Component 6 measures total fat consumption as a percentage of total food energy (calorie) intake. Component 7 measures saturated fat consumption as a percentage of total food energy intake. Components 8 and 9 measure total cholesterol intake and total sodium intake, respectively. And component 10 measures the degree of variety in a person's diet.

Each component of the Index has a maximum score of 10 and a minimum score of zero. Intermediate scores are computed proportionately. High component scores indicate intakes close to recommended ranges or amounts; low component scores indicate less compliance with recommended ranges or amounts. The maximum combined score for the 10 components is 100. An HEI score above 80 implies a good diet; an HEI score between 51 and 80 implies a diet that needs improvement; an HEI score less than 51 implies a poor diet.

### ***Healthy Eating Index: Overall and Component Scores***

Most children have a diet that needs improvement or is poor (figure). As children get older, their overall HEI score declines (table). Consequently,

## Healthy Eating Index rating by children's age group, 1994-96



## Healthy Eating Index: Overall and component mean scores for children, 1994-96 (percent of children meeting the dietary recommendations for each component in parentheses)

	Children 2-3	Children 4-6	Children 7-10	Females 11-14	Males 11-14	Females 15-18	Males 15-18
<b>Overall HEI score</b>	<b>73.8</b>	<b>67.8</b>	<b>66.6</b>	<b>63.5</b>	<b>62.2</b>	<b>60.9</b>	<b>60.7</b>
1. Grains	8.3 (54)	7.2 (27)	7.6 (31)	6.7 (16)	7.2 (29)	6.3 (17)	7.5 (34)
2. Vegetables	5.9 (31)	4.9 (16)	5.1 (20)	5.5 (24)	5.4 (23)	5.8 (26)	6.3 (35)
3. Fruits	7.0 (53)	5.3 (29)	4.3 (18)	3.9 (14)	3.5 (9)	3.1 (12)	2.8 (11)
4. Milk	7.2 (44)	7.4 (44)	7.6 (49)	5.2 (15)	6.2 (27)	4.2 (12)	6.1 (28)
5. Meat	6.3 (28)	5.3 (14)	5.5 (17)	5.7 (15)	6.5 (28)	5.8 (21)	6.9 (36)
6. Total fat	7.4 (40)	7.3 (38)	7.2 (35)	7.2 (37)	6.8 (33)	7.1 (38)	6.8 (34)
7. Saturated fat	5.4 (27)	5.6 (28)	5.7 (28)	5.8 (31)	5.7 (32)	6.6 (42)	6.0 (35)
8. Cholesterol	9.0 (83)	8.9 (83)	8.7 (80)	8.5 (78)	7.6 (69)	8.4 (77)	6.7 (58)
9. Sodium	8.8 (64)	8.1 (53)	6.8 (34)	7.1 (39)	5.2 (21)	6.9 (37)	3.7 (15)
10. Variety	8.4 (64)	7.9 (53)	8.1 (54)	7.8 (51)	8.1 (58)	6.7 (37)	7.8 (51)

the percentage having a good diet declines, and the percentage having a diet that needs improvement or is poor increases (figure). For children ages 2 to 3, 35 percent have a good diet, and 5 percent have a poor diet. For males 15 to 18 years old, only 6 percent have a good diet, and 21 percent have a poor diet. Much of the decline in diet quality for children occurs between the age groups 2 to 3 and 4 to 6. During this period, the percentage of children having a good diet falls from 35 to 16 percent, and the percentage having a diet that needs improvement rises from 60 to 75 percent. There is also a noticeable decline in diet quality between the 7 to 10 and 11 to 14 age groups, with the percentage of children having a good diet falling from 14 to 7 percent.

The decline in children's diet as they get older is linked to declines in their fruit and milk component scores of the HEI. The average fruit score falls from 7.0 for children ages 2 to 3 to 3.1 for females and 2.8 for males ages 15 to 18. Only 11 to 12 percent of these older children meet the dietary recommendation for fruit (table). The milk group score increases as children get older, until ages 7 to 10, where it peaks at 7.6. It then declines considerably. Females ages 15 to 18 have a particularly low milk score—4.2. Only 12 percent of these girls meet the dietary recommendation for milk servings.

Although children ages 2 to 3 have the best total fat score, only 40 percent meet the dietary recommendation. Males ages 11 to 18 have the lowest fat score: 6.8, and about one-third meet the dietary recommendation. Children ages 2 to 3 and 4 to 6 have the lowest scores for saturated fat at 5.4 and 5.6, respectively, with 27 to 28 percent meeting the dietary recommendation. Females ages 15 to 18

have the best saturated fat score at 6.6. But, only 42 percent meet the dietary recommendation.

Cholesterol and sodium scores are relatively good for preschoolers, with most of these children meeting the dietary recommendations. The cholesterol score declines steadily as children get older. It falls from 9.0 for children ages 2 to 3 to 6.7 for males ages 15 to 18. Females ages 11 to 18 have higher cholesterol scores than do their male counterparts. The cholesterol component is the only HEI component for which the majority of children in all age groups meet the dietary recommendation of 300 milligrams or less of dietary cholesterol each day. However, males ages 15 to 18 need to work harder to meet this goal because only 58 percent meet this guidance. The sodium score also declines as children get older. The sodium score averages 8.8 for children ages 2 to 3 and declines to 6.9 for females and 3.7 for males ages 15 to 18. Only 15 percent of males ages 15 to 18 meet the recommendation of 2,400 milligrams or less of sodium each day.

## Conclusion

The diet of most children needs substantial improvement in order to meet the dietary recommendations with respect to fruits, vegetables, and milk products. Both teenage girls and boys are particularly deficient in their consumption of fruits and milk. Twelve percent or less of adolescents ages 15 to 18 meet the dietary recommendation for fruits. Only 12 percent of girls ages 15 to 18 meet the dietary recommendation for milk. And males ages 11 to 18 need to decrease their sodium intake.

This *Nutrition Insight* provides a better understanding of the types of dietary

changes needed to improve children's eating patterns. Nutrition professionals may use these results to tailor their nutrition education programs aimed at improving children's dietary habits.

**Note:** For additional results and more details on the Healthy Eating Index and how it is computed, the reader should see Bowman, S.A., Lino, M., Gerrior, S.A., and Basiotis, P.P. 1998. *The Healthy Eating Index: 1994-96*. U.S. Department of Agriculture, Center for Nutrition Policy and Promotion. CNPP-5. Available at <http://www.usda.gov/cnpp>.



Insight 15  
December 1999

## Eating Breakfast Greatly Improves Schoolchildren's Diet Quality

P. Peter Basiotis  
Mark Lino  
Rajen S. Anand

Center for Nutrition Policy  
and Promotion

We reported in a previous *Nutrition Insights* that the quality of most American children's diet needs improvement. According to 1994-96 survey data, 88 percent of children ages 6 to 18 have a diet that is poor or needs improvement; only 12 percent have a good diet. While numerous studies have examined the contribution of breakfast in improving behavior and learning at school, the contribution of eating breakfast, particularly through the School Breakfast Program (SBP), to overall diet quality has received less attention. The SBP offers a nutritious breakfast to all children who attend schools participating in the program. This *Nutrition Insights* examines the association of children eating breakfast with the overall quality of their diet. Data from the 1994-96 Continuing Survey of Food Intakes by Individuals (CSFII) were analyzed. The CSFII is a nationally representative survey containing information on people's consumption of foods and nutrients. The quality of children's diet was assessed by using the Healthy Eating Index (HEI).

Children between the ages of 6 and 18 (school-age children) in low- and higher income households were examined separately because diet quality varies by household income level. Households with an income below 185 percent of the poverty threshold were defined as low income because this is the income

cut-off for children in these households being eligible for a free or reduced-price school breakfast or lunch. Data collected during a weekend, the summer, or December were omitted in order to examine the effects of the SBP; the data thus represented a typical school day. The sample size used in this analysis was 1,295 children. Data were weighted to represent the population.

### *The Healthy Eating Index*

The HEI, computed on a regular basis by the U.S. Department of Agriculture (USDA), is a summary measure of the overall quality of people's diet. The Index is based on 10 components. Five components measure the degree to which a person's diet conforms to the USDA's Food Guide Pyramid serving recommendations for the major food groups: Grains (bread, cereal, rice, and pasta), vegetables, fruits, milk (milk, yogurt, and cheese), and meat (meat, poultry, fish, dry beans, eggs, and nuts). Four components measure the compliance with dietary recommendations for total fat, saturated fat, cholesterol, and sodium intake. The final component evaluates the extent of variety in the diet.

Each component of the Index has a maximum score of 10 and a minimum score of zero. The maximum overall

score for the 10 components combined is 100. High component scores indicate intakes close to recommended ranges or amounts; low component scores indicate less compliance with recommended ranges or amounts. An HEI score above 80 implies a good diet, an HEI score between 51 and 80 implies a diet that need improvement, and an HEI score less than 51 implies a poor diet.

### ***Children's Consumption of Breakfast***

Overall, 67 percent of children in low-income households ate breakfast at home or some place other than school, such as a restaurant/fast-food establishment, 19 percent ate breakfast at school, and 14 percent did not eat breakfast (fig. 1). For children in higher income households, 82 percent ate breakfast at home or some place other than school, 16 percent did not eat breakfast, and 2 percent ate breakfast at school (fig. 2).

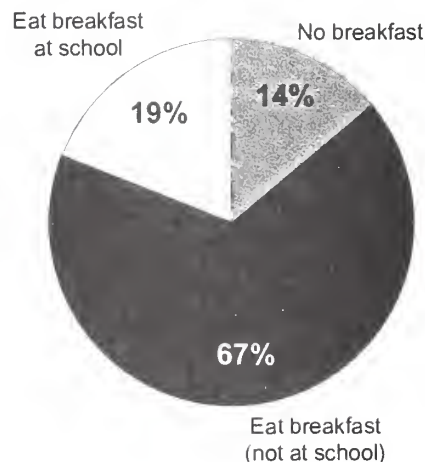
### ***Effects of Breakfast Consumption on the HEI***

Children in both low- and higher income households who consume breakfast had a higher overall HEI score than children who do not consume breakfast. (HEI scores were not calculated for children in higher income households who ate breakfast at school because of the small sample size.) Among children in low-income households, those who ate a school breakfast had a statistically significant higher HEI score (67) than children who ate breakfast at home or elsewhere (63) and children who did not eat breakfast (57) (see table). All groups of children, however, had an average HEI score that indicates their diet needs improvement.

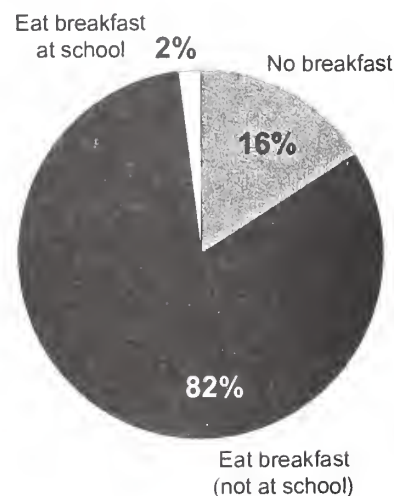
For the HEI components, regardless of income level, children who ate breakfast had significantly better component scores for grains, fruits, milk products, and variety than children who did not eat breakfast. The differences are particularly noticeable for children in low-income households who ate a school breakfast. Among children in low-income households, those who ate a school breakfast had an average fruit score of 5.4, compared with 2.1 for those who did not eat breakfast. Likewise, among children in low-income households, those who ate a school breakfast had an average milk score of 8.8, compared with 4.4 for children who did not eat breakfast. Milk is a required food in the SBP, and fruit juice is one of the most frequently served foods in the SBP. The average variety score for low-income children who ate a school breakfast was 9.0, compared with 6.2 for low-income children who did not eat breakfast.

Children in low-income households who ate a school breakfast had a significantly lower HEI component score—meaning less compliance with the recommendation—for saturated fat (3.7) than children who ate breakfast elsewhere (5.4). The reasons for this are unclear and may not be directly attributable to the SBP. However, some schools participating in the SBP serve foods relatively high in saturated fat, such as sausages and butter. Among children in higher income households, those who ate a breakfast had a better total fat score than those who did not eat breakfast.

**Figure 1. Breakfast consumption: Children in low-income households**



**Figure 2. Breakfast consumption: Children in higher income households**



## HEI and component scores by breakfast consumption: Children in low- and higher income households

	Low income			Higher income	
	No breakfast	Eat breakfast		No breakfast	Eat breakfast
		Not at school	At school		Not at school
Overall HEI	57 <sup>a</sup>	63 <sup>b</sup>	67 <sup>c</sup>	60 <sup>a</sup>	68 <sup>b</sup>
Grains	5.9 <sup>a</sup>	7.3 <sup>b</sup>	7.1 <sup>b</sup>	6.4 <sup>a</sup>	7.6 <sup>b</sup>
Vegetables	5.9	5.7	5.9	6.1	5.5
Fruits	2.1 <sup>a</sup>	3.7 <sup>b</sup>	5.4 <sup>c</sup>	2.6 <sup>a</sup>	4.6 <sup>b</sup>
Milk	4.4 <sup>a</sup>	6.5 <sup>b</sup>	8.8 <sup>c</sup>	4.7 <sup>a</sup>	7.2 <sup>b</sup>
Meat	6.2	6.4	6.9	6.1	5.5
Total fat	6.3	6.6	6.0	6.4 <sup>a</sup>	7.5 <sup>b</sup>
Saturated fat	5.0	5.4 <sup>a</sup>	3.7 <sup>b</sup>	5.4	6.2
Cholesterol	8.5 <sup>a</sup>	7.3 <sup>b</sup>	7.9	8.3	8.9
Sodium	6.7	6.1	6.3	6.8	6.2
Variety	6.2 <sup>a</sup>	8.1 <sup>b</sup>	9.0 <sup>c</sup>	6.8 <sup>a</sup>	8.5 <sup>b</sup>

Note: Means with different superscripts are significantly different at .05.

### Do Results Hold After Controlling for Other Factors?

It could be that other factors besides consuming breakfast, particularly a breakfast at school, are affecting the diets of children. These other factors include household characteristics (income, size, region/urbanization, and food stamp participation) and child characteristics (age, gender, race, ethnic origin, vitamin/mineral use, health status, and being on a special diet). Multivariate analysis is a statistical method that takes into account the effects of these other factors. Such analysis confirmed the descriptive results of this study. Among children in both low- and higher income households, those who ate breakfast had a statistically significantly better overall diet, as measured by the HEI. Children

who ate a school breakfast had an even better overall diet. For all children, consuming breakfast was associated with higher grain, fruit, milk, and variety scores; eating a breakfast at school was associated with even better fruit, milk, and variety scores.

Clearly, then, breakfast is a very important contributor to the quality of American schoolchildren's overall diet.

**Note:** For more details on the Healthy Eating Index and how it is computed, the reader should see Bowman, S.A., Lino, M., Gerrior, S.A., Basiotis, P.P. 1998. *The Healthy Eating Index: 1994-96*. U.S. Department of Agriculture, Center for Nutrition Policy and Promotion. CNPP-5. This report is available at <http://www.usda.gov/cnpp>.





## Contribution of Away-From-Home Foods to American Diet Quality

Eating out has become increasingly popular for Americans. In 1970, 26 percent of total food expenditure was spent away from home; by 1996, that share was 39 percent. Reasons for this trend include the growing number of women working outside the home, more two-earner households, higher incomes, smaller households, and more affordable and convenient fast-food outlets.

This study analyzes food intake survey data collected by the U.S. Department of Agriculture (USDA) over the past two decades to compare the nutritional quality of home and away-from-home foods.<sup>1</sup> Also, it examines how the quality has changed over time. This historical comparison shows how dining out influences specific dietary components: excessive intakes of total fat, saturated fat, cholesterol, and sodium and low intakes of fiber, calcium, and iron.

### The Data: 1977-95

Individual food intakes were collected in two decennial surveys conducted by USDA—the Nationwide Food Consumption Surveys (NFCS) of 1977-78 and 1987-88. In 1985 USDA started the Continuing Survey of Food Intakes by Individuals (CSFII) for relatively small national samples. During 1989-91 three

separate 1-year surveys collected information on individual food intakes from nationally representative samples. Again, in 1994-96, three separate 1-year CSFII surveys were conducted.

Data for this study were from seven year-round, nationwide surveys of individual food intakes: NFCS 1977-78, NFCS 1987-88, CSFII 1989, CSFII 1990, CSFII 1991, CSFII 1994, and CSFII 1995. The CSFII 1985-86 data were excluded because they did not represent all Americans. The first five surveys collected dietary intakes for 3 consecutive days—a 1-day recall and a 2-day record; the latter two surveys recorded 2 nonconsecutive days of food consumption. For the most accurate comparison of the seven surveys' data, only the first day from each survey was included in the analysis.

Intake data for children under age 2, pregnant and lactating women, and individuals with incomplete dietary intake data were excluded from this analysis. Sources of away-from-home food were grouped into five categories: Fast-food places; schools, camps, day-care centers; restaurants; other public eating places, including residential dining facilities, bars, soup kitchens, and meals on wheels; and other (a catch-all category, including vending machines and someone's home). Meals and snacks consisting of a combination of home and away-from-home foods were classified according to the highest caloric component.

### Meal and Snack Eating Patterns

The number of meals consumed by Americans has remained stable over the past two decades at 2.6 or 2.7. Snacking, however, increased from less than once a day in 1987-88 to 1.6 times a day in

<sup>1</sup>Home and away-from-home foods are defined based on where foods are obtained, not where they are eaten. Home food is purchased at a retail store and food away from home is purchased mainly from foodservice establishments. Both food at home and food away from home can be eaten at home or away from home.

Table 1. Meal and snack eating patterns of Americans,<sup>1</sup> 1977-95

	1977-78	1987-88	1989	1990	1991	1994	1995
	<i>Number</i>						
Meals per day	2.7	2.6	2.6	2.6	2.6	2.7	2.6
Snacks per day	1.1	0.9	1.2	1.2	1.4	1.5	1.6
	<i>Percent</i>						
Meals eaten away from home <sup>2</sup>	16	24	24	23	27	28	29
Snacks eaten away from home <sup>2</sup>	17	20	20	18	18	21	22
All meals and snacks eaten away from home <sup>2</sup>	16	23	23	22	24	26	27
Restaurant	2	4	4	4	4	6	5
Fast food	3	7	7	7	7	8	9
School <sup>3</sup>	3	2	2	2	3	2	2
Other public	3	2	2	2	2	2	2
Others	6	8	8	7	8	8	9

<sup>1</sup> Ages 2 and older, excluding pregnant and lactating women and those who did not provide complete dietary intake data.

<sup>2</sup> Away from home presents the aggregate of fast foods, restaurants, schools, other public places, and others.

<sup>3</sup> Schools are classified as a separate category for children only; for adults, they are included in "others."

Compiled by Economic Research Service, USDA, from NFCS 1977-78, NFCS 1987-88, CSFII 1989-91, and CSFII 1994-95, first-day intake data.

1995 (table 1). The percentage of meals eaten away from home increased from 16 percent in 1977-78 to 29 percent in 1995, and the percentage of snacks away from home rose from 17 percent in 1977-78 to 22 percent in 1995. The increasing frequency of dining out means that Americans are getting more of their nutrients from away-from-home sources (table 2). For example, away-from-home foods provided 34 percent of total calories in 1995, up from 18 percent in 1977-78. Away-from-home foods also provided 38 percent of total fat intake in 1995, more than double the 18 percent provided in 1977-78. Thus, the nutritional quality of food away from home has become increasingly important in determining the overall nutritional quality of diets in the United States.

## Nutritional Quality of Home and Away-From-Home Foods

The nutritional quality of foods was compared by using the nutrient-to-calorie density (nutrient density), which measures the amount of a nutrient or food component for each 1,000 calories of that food. For fat and saturated fat, the proportion of total calories that come from fat and saturated fat were used as measures of density.

A "benchmark" density was derived by dividing the recommendation<sup>2</sup> for a given nutrient or food component by an individual's reported caloric intake in 1,000

calories. The benchmark density represents the nutrient density an individual's diet would have to reach to meet the dietary recommendation for that caloric level. When the nutrient is consumed in amounts higher (lower) than the recommended levels, the benchmark density for that nutrient will be lower (higher) than the nutrient density. Benchmark densities vary from year to year because caloric intakes vary from year to year. For any nutrient, a higher caloric intake means less of that nutrient is needed per 1,000 calories to meet the same recommended intake level. Therefore, an increase in caloric intake means a lower benchmark density.

<sup>2</sup> Dietary recommendations were from the Dietary Guidelines for Americans and other health authorities.

**Table 2. Consumption of selected nutrients and food components in away-from-home foods,<sup>1</sup> as part of total diet, 1977-95**

	1977-78	1987-88	1989	1990	1991	1994	1995
	<i>Percent</i>						
Calories	18	27	27	26	29	31	34
Total fat	18	28	29	28	32	35	38
Saturated fat	NA	28	29	28	31	33	37
Cholesterol	NA	26	25	25	30	32	34
Sodium	NA	27	26	26	30	32	34
Fiber	NA	22	23	22	25	26	27
Calcium	17	23	23	22	25	26	29
Iron	16	22	22	21	25	26	27

NA = Not available.

<sup>1</sup>Away from home presents the aggregate of fast foods, restaurants, schools, other public places, and others.

Compiled by Economic Research Service, USDA, from NFCS 1977-78, NFCS 1987-88, CSFII 1989-91, and CSFII 1994-95, first-day intake data.

### Caloric Intake

Because of potential underreporting, caloric and nutrient intake estimates from dietary recall surveys usually represent a lower limit of actual intakes. Also, the method of conducting dietary recall interviews has changed over the years to improve the accuracy of reporting. Reported trends in caloric and nutrient intakes may reflect these changes and must be considered when interpreting results.

Average caloric intake declined from 1,876 calories per person per day in 1977-78 to 1,807 calories in 1987-88, then rose steadily to 2,043 calories in 1995 (table 3). The percentage of Americans age 2 and older who consumed the recommended energy allowance (REA) or more rose from 22 percent in 1987-88 to 31 percent in 1995. Even so, the proportion of adults in the United States who were considered overweight in 1988-94 was more than one in three (35 percent), an increase from one in four in 1976-80.

Some of the observed increase in caloric intake may be due to increased eating out. Away-from-home food was eaten at 16 percent of all meals and snacks in 1977-78 and accounted for 18 percent of total caloric intake; in 1995, away-from-home food accounted for 27 percent of all meals and snacks and 34 percent of total caloric intake. These numbers suggest that when eating away from home, people eat either larger quantities or higher calorie foods—or both—than when eating at home.

As the number of meals and snacks eaten at fast-food places and restaurants has increased over the past two decades, so has the percentage of total calories consumed from these locations. Fast-food places accounted for 3 percent of total caloric intake in 1977-78 but 12 percent in 1995; restaurants' share of total calories was 3 percent in 1977-78 and 8 percent in 1995.

### Fat and Saturated Fat

The benchmark densities for fat and saturated fat are no more than 30 and 10 percent of total calories, respectively. Over the past two decades, Americans have eaten less fatty foods. Fat provided an average of 33.6 percent of total calories in 1995, considerably less than the 41.1 percent of 1977-78. Fat density declined for both home foods (from 41.1 percent in 1977-78 to 31.5 percent in 1995) and away-from-home foods (from 41.2 percent to 37.6 percent).

Restaurant foods had a considerably higher fat density (46.2 percent) than either fast foods (41.6 percent) or school foods (40.1 percent) in 1977-78. Fat density of restaurant foods declined to 40.1 percent in 1995, fast foods to 39.3 percent, and school foods to 35.7 percent.

The saturated fat density of American diets was first measured in 1987-88. Home foods had a lower saturated fat density than away-from-home foods; this density declined in both types of

**Table 3. Caloric intake and sources for Americans,<sup>1</sup> 1977-95**

	1977-78	1987-88	1989	1990	1991	1994	1995
	<i>Calories</i>						
Average caloric intake	1,876	1,807	1,837	1,853	1,883	2,006	2,043
	<i>Percent</i>						
People consuming more than REA <sup>2</sup>	26	22	24	26	26	28	31
Portion of total calories:							
At home	82	73	73	74	71	69	66
Away from home <sup>3</sup>	18	27	27	26	29	31	34
Restaurants	3	5	7	6	6	8	8
Fast foods	3	8	9	9	9	11	12
Schools <sup>3</sup>	3	3	2	2	3	2	2
Other public	3	2	3	2	3	3	2
Others	6	9	7	8	9	7	9

<sup>1</sup> Ages 2 and older, excluding pregnant and lactating women and those who did not provide complete dietary intake data.

<sup>2</sup> REA = Recommended energy allowance (per day).

<sup>3</sup> Away from home presents the aggregate of fast foods, restaurants, schools, other public places, and others.

<sup>4</sup> Schools are classified as a separate category for children only; for adults, they are included in "others."

Compiled by Economic Research Service, USDA, from NFCS 1977-78, NFCS 1987-88, CSFII 1989-91, and CSFII 1994-95, first-day intake data.

foods through 1994. Since 1989, saturated fat density in school foods has been higher than in other away-from-home locations—14.2 percent of calories in 1995. The saturated fat density of home foods in 1995 was 10.9 percent and that for all away-from-home foods, 12.8 percent.

### Cholesterol

The recommended daily cholesterol intake used to set the Daily Value for nutrition labeling is 300 milligrams (mg) or less. This recommended intake is fixed, regardless of caloric intake. In 1987-88, when cholesterol content of U.S. diets was first measured, average cholesterol intake was 286 mg per person per day. In 1995, it was 268 mg. Thus, cholesterol levels have been safely below the benchmark level. Cholesterol

densities in both home (161 in 1987-88 to 129 in 1995) and away-from-home (151 in 1987-88 to 134 in 1995) foods have been markedly reduced during the past decade. Compared with all other sources, restaurant food has been consistently higher in cholesterol, with densities of 215 in 1978-88 and 176 in 1995. Males ages 12 to 39 (who tend to eat more than others yet have identical cholesterol recommendations) are those most likely to exceed the benchmark level of 300 mg per day.

### Sodium

Sodium intakes as defined in the NFCS and CSFII include sodium occurring naturally in foods, as well as that added during food processing and food preparation. These intakes do not include sodium added at the table. The National

Academy of Sciences recommends fewer than 2,400 mg of sodium per day, regardless of age and gender. As with cholesterol, those who consume more calories have lower benchmarks than do those consuming fewer calories.

Average daily sodium intake increased from 3,023 mg in 1987-88 to 3,348 mg in 1995. The sodium densities of home and away-from-home foods are fairly similar—both substantially higher than the benchmark density. Restaurant foods contain much more sodium than other away-from-home foods, even though some decline has been observed since 1991. Overconsumption of sodium is a problem for most consumers except for young children and elderly women who tend to consume less calories than others.



## Calcium

The 1989 Recommended Daily Allowances (RDA) for calcium, used in this study, were 1,200 mg for those ages 11 to 24 and 800 mg for all others. In 1997, the Institute of Medicine of the National Academy of Sciences issued new dietary recommendations for several nutrients. The recommended calcium intakes for many Americans (children age 9 and older and adults age 25 and older) were raised.

A higher percentage of Americans met the 1989 calcium RDA in 1995 than in 1977-78. The calcium density of home foods showed a general increase, while that of away-from-home foods declined slightly. In 1995, the calcium density of away-from-home foods was 21 percent below the benchmark. School foods, however, had a calcium density 62 percent higher than home foods, 95 percent higher than fast foods, and 137 percent higher than restaurant foods.

Insufficient calcium intake is a more severe problem for teenage girls and women because of their higher calcium requirements and their lower food consumption. In 1995, only 18 percent of girls ages 12 to 17 met their calcium RDAs.

## Dietary Fiber

Two separate benchmarks were used for dietary fiber: for those ages 2 to 20, "age plus 5" (recommended by the American Health Foundation), and for those age 21 and older, a Daily Value of 11.5 grams per 1,000 calories (recommended by the FDA). Average fiber intake increased from 12.7 grams in 1978-88 to 15.2 grams in 1995. Eighteen percent of Americans met fiber intake recommendations in 1978-88; 24 percent met the recommendations in 1995. Over the

past decade, fiber densities of home foods increased slightly—from 7.5 grams per 1,000 calories in 1987-88 to 8.1 in 1995. Fiber densities for away-from-home foods increased even less—from 5.8 in 1987-88 to 6.1 in 1995. For children, school foods declined in fiber density, from 7.6 grams per 1,000 calories in 1987-88 to 7.1 in 1995. Fiber densities of fast foods trended upward but remained low at 5.6 grams in 1995. The fiber density of restaurant foods increased from 5.8 grams per 1,000 calories in 1987-88 to 6.2 grams in 1995. The increased popularity of these eating places will make it difficult for Americans to achieve fiber intake recommendations.

## Dietary Iron

The RDAs for iron are 12 mg for males ages 11 to 18, 15 mg for females 11 to 50, and 10 mg for children 2 to 10. Because of the increased consumption of iron-fortified breakfast cereals at home, iron density rose more rapidly for home foods than for away-from-home foods. However, iron densities of both home and away-from-home foods increased. Since 1987-88 children's and adults' average daily consumption of dietary iron exceeded the RDAs. The percentage of children and adults who met their RDA for iron increased from 42 percent in 1977-78 to 61 percent in 1995. Iron densities of restaurant foods, school foods, and fast foods have shown an upward trend over the past two decades.

Low iron intake is common among teenage girls and women—who have the highest requirements and typically low food consumption. Only one in three women ages 18 to 39 met their iron RDAs in 1995.

## Conclusion

Away-from-home foods generally contain more of the nutrients overconsumed and less of the nutrients underconsumed by Americans. The increased popularity of dining out may make it more difficult to improve the overall nutritional quality of diets. Because this trend is expected to continue, nutrition policy, educational programs, and promotion strategies could address nutritional quality of food away from home and consumers' food choices when eating out.

Food away from home does not have to differ nutritionally from food prepared at home. Consumer demand for such foods, however, must be strong enough to create an economic incentive for increased marketing of nutritious items by restaurants and fast-food establishments. Consumers may have a different attitude about food away from home than food at home. They may consider it as an occasional treat that does not have the same effect on the overall diet as food at home. Consumers may not realize the extent to which eating out has become a part of their usual diets. To the degree that consumer attitudes are a barrier to change, nutrition education and promotion strategies may be able to inform consumers of the effect of away-from-home food on overall diet quality.

---

Source: Lin, B-H., Frazao, E., and Guthrie, J., 1999, *Away-From-Home Foods Increasingly Important to Quality of American Diet*, Agricultural Information Bulletin No. 749, U.S. Department of Agriculture and U.S. Department of Health and Human Services.

## The Rural Poor's Access to Supermarkets and Large Grocery Stores

A recent study by the U.S. Department of Agriculture's (USDA) Economic Research Service (ERS) found that retail food prices varied with the type of store and its location. Compared with metro areas, rural areas support fewer supermarkets and a larger percentage of smaller grocery stores. Also, rural households face supermarket prices about 4 percent higher than those available to suburban households.

Nationwide, supermarket prices average 10 percent lower than prices in other grocery stores, such as "mom and pop" stores or convenience stores. Supermarkets can take advantage of economies of scale (as sales increase, costs per unit decline) by having smaller markups—and, thus, lower prices. The larger physical size of supermarkets also allows for greater product variety and more economical brands (store-label and generic) and package sizes.

Although poor households spent 76.7 percent of food stamps in supermarkets nationwide, rural supermarkets accounted for just 58.9 percent of all rural food stamp redemptions. In low-income rural areas, supermarkets accounted for only 52.8 percent of total redemptions.

Because of price differences between supermarkets in rural and suburban areas, and the lower use of supermarkets in poor rural areas, poor rural households face food prices that are 2.5 percent higher, on average, than other rural households face and that are 3.1 percent higher than those suburban households face.

ERS investigated access to food stores in 36 rural, high-poverty counties bordering the Mississippi River. Prior studies have focused on households in urban metro areas because they account for three-quarters of the total U.S. population. The selection of this particular area—the Lower Mississippi Delta region—supports the work of the Nutrition Intervention Research

### Large food retailer sales and food stamp redemptions, by store sales class, Lower Delta core counties

*Low-income households spend more in smaller supermarkets and grocery stores than in larger supermarkets.*



<sup>1</sup>Annual sales \$6 million or more.

<sup>2</sup>Annual sales \$2 million up to \$6 million.

<sup>3</sup>Annual sales \$500,000 up to \$2 million.

Source: Food and Nutrition Service, U.S. Department of Agriculture.

**Table 1. Net accessibility of all households to larger food retailers: Lower Delta core counties<sup>1</sup>**

*The net accessibility ratio exceeded 1.0 in 38 percent of ZIP Codes, representing 72.4 percent of the total population in the Lower Delta region.*

Net accessibility ratio (R)	ZIP Codes	ZIP Code households	ZIP Code population	ZIP Code households without car
<i>Number</i>				
Less than 0.5	0	0	0	0
0.5 - 0.749	22	9,567	28,319	1,570
0.75 - 1.0	102	65,832	198,526	11,950
More than 1.0	76	197,389	584,508	37,892
36-county total	200	272,788	811,353	51,412
<i>Percent share<sup>2</sup></i>				
Less than 0.5	0	0	0	0
0.5 - 0.749	11.0	3.5	3.5	16.4
0.75 - 1.0	51.0	24.1	24.5	18.1
More than 1.0	38.0	72.4	72.0	19.2

<sup>1</sup>Net accessibility ratio = (accessible food sales)/(accessible food expenditures).

<sup>2</sup>Percentages may not sum to 100 due to rounding.

Source: Economic Research Service, USDA.

Initiative (NIRI), a consortium of seven partners, including USDA and six higher education and research institutions located in the region. The aim of NIRI is to improve the health and well-being of people in the Lower Delta region, and one of its objectives is to improve access to affordable, quality food by low-income households.

The 36-county area where the study was conducted contained 222 large food retail outlets with gross sales in 1993 of \$909 million; food stamp redemption in these stores totaled \$113 million. Supermarkets with annual sales of \$6 million or more accounted for 54.3 percent of gross sales but only 42.4 percent of food stamp redemptions (figure).

The availability of large food retailers can be gauged by the average number of square miles per store for a given area. For example, in the 36 counties, there was one supermarket per 190.5 square miles; for all rural counties in Arkansas, Louisiana, and Mississippi, there was one supermarket per 153.5 square miles. When large grocery stores are included, the average square miles per large retailer in all rural counties improved to 101.6.

Household access to larger grocery stores was determined, and the level of accessible annual food dollars in the area where the study was conducted was separated into ZIP Code quartiles. ZIP Codes in the quartile with the highest food sales accounted for 57.2 percent of the population in the area where the study was

conducted. The level of household food expenditures available to a retail food location was also separated into ZIP Code quartiles. The highest quartile accounted for 51.4 percent of the population in the area included in the study. Net accessibility ratios were calculated by dividing accessible food sales by accessible food expenditures and then tabulated (table 1). Of the 200 ZIP Codes that made up the core study area, 124 had accessibility ratios less than 1.0—indicating that food expenditures were not fully satisfied by accessible large retailers.

A separate analysis of low-income households showed that they are less likely to travel a considerable distance to reach large retail outlets, because low-income householders may not own or

**Table 2. Net accessibility of low-income households to large food retailers: Lower Delta core counties<sup>1</sup>**  
*The net accessibility ratio exceeded 1.0 in only 22.5 percent of Lower Delta ZIP Codes, representing less than one-third of the total low-income population.*

Net accessibility ratio (R)	ZIP Codes	ZIP Code low-income households <sup>2</sup>	ZIP Code low-income population <sup>3</sup>	ZIP Code households without car
<i>Number</i>				
Less than 0.5	9	7,209	21,626	na
0.5 - 0.749	35	21,698	65,097	na
0.75 - 1.0	111	49,137	245,051	na
More than 1.0	45	81,683	147,412	na
36-county total	200	159,727	479,186	na
<i>Percent share<sup>4</sup></i>				
Less than 0.5	4.5	4.5	4.5	na
0.5 - 0.749	17.5	13.6	13.6	na
0.75 - 1.0	55.5	51.1	51.1	na
More than 1.0	22.5	30.8	30.8	na

<sup>1</sup>Net accessibility ratio = (accessible food stamp redemptions)/(accessible food stamp issuances).

<sup>2</sup>Estimated.

<sup>3</sup>Based on 130 percent of poverty household income threshold.

<sup>4</sup>Percentages may not sum to 100 due to rounding.

na = Not available.

Source: Economic Research Service, USDA.

have access to transportation, or they may not be able to afford it. As a proxy for food purchases by low-income households and sales by large retailers, aggregate ZIP Code-level data (obtained from the Food and Nutrition Service of the U.S. Department of Agriculture) were used. These data include food stamp redemptions by large retailers and food stamp issuances made to households from each ZIP Code in the Lower Delta region.

The ratio of accessible food stamp redemptions to accessible food stamp issuances was calculated for each ZIP Code in the same way as was the net-accessibility ratio for all households. Of the 200 ZIP Codes in the 36-county core area, only 45 (22.5 percent) had ratios exceeding 1.0 (table 2). Compared with all households, low-income households appear to be located disproportionately in areas of net-accessibility shortfalls. Within the 36 counties, a relatively large share of the total area

had insufficient net accessibility. Given their low-income status, households in these areas were less likely to travel to large retailers beyond the 30-mile retail range. Instead, they needed to rely more on small grocery stores and convenience stores that offer fewer selections and generally higher prices.

Source: Kaufman, P.R., 1999, Rural poor have less access to supermarkets, large grocery stores, *Rural Development Perspectives* 13(3):19-25.



# Poverty and Well-Being in Rural America

Four aspects of rural poverty and well-being are discussed and compared with urban America: The rural poverty rate, the socioeconomic well-being of rural children, levels of food security in rural households, and housing problems in rural America.

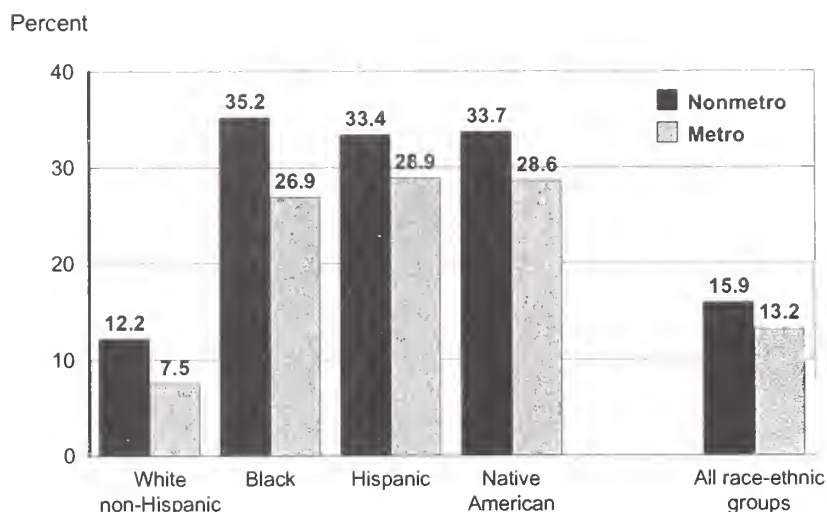
## Rural Poverty Rate

In 1996 the poverty rate in rural America was 15.9 percent, essentially unchanged from 1995. The urban poverty rate in 1996 was 13.2 percent. The rural poverty rate varied by only 1.6 percentage points in the last 8 years.

Poverty rates among rural minorities were nearly three times as high as for rural Whites and substantially higher than those of urban minorities (figure). The poverty rate was highest for rural Blacks, followed by rural Native Americans and rural Hispanics. Poverty rates were higher for female-headed families than for other household types, and rural Blacks and Native Americans had higher percentages of households headed by a female than did rural Whites. Rural minorities had, on average, less education than rural Whites, and education was a strong predictor of income. Even for people with similar education in households of the same type, poverty rates for rural minorities were about twice those of non-Hispanic Whites. Differences also may be caused by discrimination in employment and wages and concentrations of minorities in areas that are unable to attract high-wage employers.

## Poverty rates, by race/ethnicity and residence, 1996

*Poverty rates are highest for rural minorities, nearly three times those of Whites and substantially higher than those of urban minorities.*



Source: Calculated by ERS using data from the March 1997 Current Population Survey.

In 1996, 3.2 million rural children under the age of 18 lived in families with income below the poverty level. While the poverty rate for all rural children was 22.4 percent, the rates for rural Black children and for rural Hispanic children were twice as high; 46.2 and 41.2 percent, respectively. Most rural poor children (61.9 percent) lived in single-parent families, and the poverty rate for these families was 47.3 percent, compared with 12 percent for rural children in two-parent families. More than half of the rural poor lived in families headed by single women (or were women living alone).

Almost two-thirds of rural poor people lived in families with at least one working member or, if they lived alone, were themselves employed. Among rural households with full-time workers, the poverty rate was 5.0 percent.

Rural poverty rates were highest in the South and West (18.7 and 18.4 percent, respectively); over half of the rural poor (51.6 percent) lived in the South. The Northeast was the only region where the poverty rate was higher for urban areas than for rural areas.

## The Socioeconomic Well-Being of Rural Children

The Personal Responsibility and Work Opportunity Reconciliation Act of 1996 requires that the U.S. Bureau of the Census provide each State with a current annual estimate of the poverty rate for its children less than 6 years old. If the rate has increased by more than 5 percent over the previous year's rate and that increase is attributable to the effects of welfare reform, the State must submit a corrective action plan.

A comparison of urban and rural children shows marked differences in their socioeconomic well-being, region of residence, and racial/ethnic background. There was, however, considerable similarity in their age, family structure, parental education, and absence of a wage earner. The poverty rate for all urban and rural children was highest in the South and West—about 25 percent in both regions for urban children and about 30 percent in both regions for rural children. Although rural children were less likely to be minorities than were urban children (24 and 38 percent, respectively), poverty rates remain much higher for rural minority children than for rural White children.

Rural minority children tended to be concentrated in two regions. About 89 percent of rural Black children lived in the South, and 45 percent of Native American children lived in the West. Rural Hispanic children resided mostly in two regions—the South (47 percent) and the West (44 percent). Over one-half of rural Black children living in the South were poor.

The poverty rate for children in families with no earners was higher for urban children (92 percent) than for rural children (87 percent). Rural minority children more often lived in families with no earners than did rural White children: White, 5 percent; Black, 19 percent; Hispanic, 8 percent; and Native American, 12 percent.

Social welfare programs contribute to children's well-being by providing cash or in-kind assistance to needy families. In 1996, 1.2 million rural children lived in families participating in Aid to Families with Dependent Children (AFDC), which was replaced by the Temporary Assistance to Needy Families (TANF) program. TANF provides time-limited

## Percentage of households experiencing food insecurity, 1995

*Levels of food insecurity were very similar in rural and urban households; food insecurity was most prevalent among racial and ethnic minorities and in single-parent families with children.*

Category	Nonmetro	Metro	U.S. total
<i>Percentage of households</i>			
All households	12.2	11.9	11.9
Census region			
Northeast	9.7	10.4	10.3
Midwest	10.3	10.8	10.6
South	13.3	12.3	12.5
West	14.9	13.6	13.8
Race and ethnicity (of household head)			
White non-Hispanic	10.3	8.1	8.7
Black	28.3	23.5	24.2
Hispanic	21.3	26.2	25.7
Household structure			
Two-parent families with children	12.9	11.1	11.5
Single-parent families with children	32.8	32.2	32.3
Multiple-adult households, no children	6.9	6.3	6.4
Single men living alone	13.3	12.9	13.0
Single women living alone	10.2	11.4	11.1
<i>Percentage of persons<sup>1</sup></i>			
Age			
0-17	20.4	19.7	19.8
18-64	12.9	11.9	12.1
65 and over	5.5	5.5	5.5

<sup>1</sup>Food security is determined at the household level. In the age breakdown, the numbers represent the percentage of persons in each age category living in households classified as food insecure.

Source: Prepared by ERS using data from the Current Population Survey Food Security Supplement, April 1995.

benefits to needy families, mostly headed by single parents, and provides assistance in finding employment for the parents.

Changes in the TANF program will trigger changes in the Food Stamp Program, a program with much higher child participation rates than AFDC. Among the most important changes that affect children are the reduction of food

stamp benefits from 103 to 100 percent of the Thrifty Food Plan and the restriction of food stamp eligibility for many legal immigrants. These changes could affect 2.8 million or 20 percent of rural children.

Families of rural minority children rely more on government assistance programs than do families of rural White children. Forty-five percent of rural Black children,

36 percent of Native American children, and 29 percent of Hispanic children lived in families that received food stamps, compared with 14 percent of rural White children. Also, 15 percent of rural Black and Native American children lived in families that participated in the housing subsidy program that helps needy families pay their rent, compared with 5 percent of rural White children.

### **Levels of Food Insecurity in Rural Households**

USDA's food assistance programs are intended not only to prevent hunger, but also to ensure that all citizens—especially all children—have regular access to the quantity and quality of food needed for an active, healthy life. USDA and the Department of Health and Human Services have developed a survey to monitor food insecurity and hunger in the United States. Households are said to be food insecure when they do not have assured access, in socially acceptable ways, to enough food for an active, healthy life.

During the year prior to April 1995, only 12 percent of rural and urban households could be classified as food insecure (table). Within urban areas, food security was more prevalent in central cities (16.1 percent) than in sub-urban areas (9.5 percent). Regionally, food insecurity was highest in the rural West (14.9 percent) and lowest in the rural Northeast (9.7 percent). Rural-urban differences were not substantial in any region.

Overall, food insecurity was much more prevalent among Blacks (24.2 percent) and Hispanics (25.7 percent) than among Whites (8.7 percent). The household type that experienced the highest rates of food insecurity was the single-parent family: nearly one-third of these families

were classified as food insecure. The lowest rates of food insecurity were observed in multiple-adult, no-children, households—6.4 percent. Among those living alone, food insecurity was more prevalent among men than among women, even though the poverty rate for women living alone was substantially higher than that for men living alone.

Hunger in the United States is intermittent and often hidden. However, one or more household members experienced repeated, poverty-related hunger in 4.1 percent of U.S. households. More than 10 percent for rural Blacks as well as single-parent families with children in both rural and urban areas experienced hunger.

Less than 1 percent of households experienced what is characterized as severe hunger: adults going whole days without eating, reducing the size of children's meals, and children being hungry because there is not enough money to buy food. Estimating the percentage of children who experience poverty-related hunger is indirect and uncertain, and the quality of children's diets is often reduced even in households in which adult hunger is less severe.

### **Housing Problems in Rural America**

Recent changes in Federal housing programs have added flexibility, increased the role of State and local governments, and emphasized the inclusion of segments of the population and geographic areas that were deemed underserved by existing housing and home mortgage markets. Public policy is clearly geared toward promoting greater homeownership, as demonstrated by government tax policies and program initiatives. The rate of homeownership is at an all-time

high, with nearly two-thirds of all U.S. households and three-fourths of rural households owning their home in 1995.

In the first quarter of 1998 U.S. median household income was 34 percent more than needed to afford the median-priced home. According to this widely used indicator, housing has not been so affordable since 1973.

In 1995 homeownership was higher among nonmetro than among metro households for each of the population groups. Ownership was the dominant pattern for all nonmetro groups but not for metro Black, Hispanic, or poor households. Whereas nearly 80 percent of nonpoor White households in nonmetro areas owned their home, comparable figures for Hispanic and Black households were only 62 and 68 percent, respectively.

Housing that lacks complete plumbing facilities for the exclusive use of residents was a problem in 1995 for less than 2 percent of U.S. households. In 1960, 30 percent of nonmetro and 7 percent of metro homes lacked complete plumbing facilities. Housing expenses were more of an urban than a rural problem for all the population groups considered. As expected, excessive housing expenses were mostly a problem for the poor. Over 2 percent of nonmetro households had housing expenses that consumed over half the household's income.

Homeownership rates among the 65-and-older population were 84 percent in nonmetro and 76 percent in metro areas—well above the overall levels in 1995. The median home equity of elderly nonmetro homeowners was over \$60,000, because more than 85 percent owned their home free and clear of mortgage debt.

Source: *Rural Conditions and Trends*, 1998, 9(2):81-101.



## Alternative Employment Arrangements

Information on workers in four alternative employment arrangements was collected in the February 1997 Current Population Survey (CPS) and compared with similar information obtained in the February 1995 CPS. In general, the proportion of total employment accounted for by each arrangement, as well as the characteristics of workers, had not changed significantly.

People employed in two of these arrangements—temporary help agency workers and contract company workers—are employees of one company and carry out assignments for another. Workers in a third arrangement—workers on call—do not have an established schedule for reporting to work. The fourth arrangement—independent contractors—consists of workers who are not employees in the traditional sense but those who work for themselves. Being the largest group, independent contractors accounted for two-thirds of workers in alternative arrangements and 6.7 percent of all workers. The proportion of workers in the various alternative arrangements was unchanged between 1995 and 1997. However, the number of workers in the four arrangements increased by about 400,000 over the 2-year period.

This report covers demographic and job characteristics, earnings, and benefits of workers in each alternative arrangement and compares them with workers in traditional arrangements. Classification of workers was made without regard to their contingent status (whether their job was temporary) or their part-time

status. Part-time workers were classified in an alternative arrangement only if they met the criteria for that arrangement.

### Independent Contractors

In February 1997, 8.5 million people were identified as independent contractors, independent consultants, or freelance workers. Most independent contractors (88 percent) were self-employed. About half of all self-employed individuals were identified as independent contractors, rather than as other types of self-employed workers, such as shop or restaurant owners.

Two-thirds of independent contractors were men; they were older and had more education than the average worker (table 1). Nearly 70 percent were married, compared with 59 percent of traditional workers. About 26 percent worked less than 35 hours in a typical week, compared with 18 percent of traditional workers; however, nearly 30 percent of independent contractors worked 49 hours or more in a typical week, compared with only 17 percent of traditional workers.

The most common occupations for male independent contractors were managers, construction craftworkers, proprietors, writers and artists, and real estate and insurance salespersons. For women, the most frequently occurring occupations were managers, writers and artists, real estate and insurance salespersons, door-to-door sales, and child-care providers.

Compared with workers in the other alternative arrangements, independent contractors liked their employment arrangement—84 percent preferred it to a traditional job. Men reported that they liked being their own boss, and women

said they liked the flexibility of scheduling and the ability to meet family obligations.

Only 3.5 percent of independent contractors reported that they were contingent or temporary workers, the lowest percentage of the alternative arrangements. Median years in the arrangement were greater than those for traditional workers with their current employer, 7.7 years versus 4.8 years.

Among full-time workers, earnings of male independent contractors were higher than those of their counterparts in traditional employment, whereas earnings of female independent contractors were lower (table 2). The gender gap in earnings was greater among independent contractors (52 percent) than among traditional workers (28 percent). Health insurance coverage was reported by almost three-quarters of independent contractors; women were more likely than men to have coverage, and women with coverage were more likely to obtain it through a spouse or other family member (38 percent) than by purchasing it on their own (25 percent). About 37 percent of independent contractors had some type of pension coverage.

### On-Call Workers

These workers report to the job only when specifically asked to do so, although it may be for several days, or even weeks, in a row. Workers who are often on call include substitute teachers, construction workers, nurses, and truckdrivers. People with regularly scheduled work who also might be on call after hours (medical residents and computer technicians) were not included in this category. In February 1997, there were 2 million on-call workers.



**Table 1. Employed persons with alternative and traditional work arrangements, by selected characteristics, February 1997 [percent distribution]**

Characteristic	Workers with alternative arrangements				Workers with traditional arrangements
	Independent contractors	On-call workers	Temporary help agency workers	Workers provided by contract firms	
<b>Age</b>					
Total, 16 years and older (thousands)	8,456	1,996	1,300	809	114,199
Percent	100.0	100.0	100.0	100.0	100.0
16 to 19 years	.8	9.7	6.1	2.0	5.0
20 to 24 years	2.4	11.9	16.5	8.2	9.8
25 to 34 years	18.3	22.4	30.3	34.2	25.4
35 to 44 years	31.1	25.4	21.5	31.1	27.7
45 to 54 years	26.5	14.4	16.2	14.2	20.4
55 to 64 years	13.9	9.7	6.7	7.7	9.2
65 years and older	7.0	6.5	2.8	2.7	2.5
<b>Sex</b>					
Men, 16 years and older	66.6	49.0	44.7	69.8	52.7
Women, 16 years and older	33.4	51.0	55.3	30.2	47.3
<b>Race and Hispanic origin</b>					
White	90.7	89.3	75.1	81.6	84.8
Black	5.3	7.8	21.3	12.9	10.9
Hispanic origin	7.3	13.3	12.3	6.3	9.6
<b>Educational attainment</b>					
Total, 25 to 64 years (thousands)	7,590	1,437	970	705	94,424
Percent	100.0	100.0	100.0	100.0	100.0
Less than a high school diploma	8.7	13.4	11.1	7.1	9.7
High school graduate, no college	30.3	28.7	30.7	36.9	32.8
Less than a bachelor's degree	26.8	32.0	36.3	23.3	28.0
College graduate	34.1	25.9	21.9	32.7	29.5

Note: Workers with traditional arrangements are those who do not fall into any of the "alternative arrangements" categories. Details for the above race and Hispanic-origin groups will not sum to totals because data for the "other races" group are not presented, and Hispanics are included in both the White and Black population groups. Details for other characteristics may not sum to totals because of rounding.

**Table 2. Median weekly earnings of full-time workers with alternative and traditional work arrangements, by selected characteristics, February 1997**

Characteristic	Independent contractors	On-call workers	Temporary help agency workers	Workers provided by contract firms	Workers with traditional arrangements
<b>Age and sex</b>					
Total, 16 years and older	\$587	\$432	\$329	\$619	\$510
16 to 19 years	(1)	243	(1)	(1)	237
20 to 24 years	478	328	286	(1)	328
25 years and older	590	457	364	681	550
Men, 16 years and older	621	508	385	685	578
16 to 19 years	(1)	(1)	(1)	(1)	252
20 to 24 years	523	328	312	(1)	343
25 years and older	624	524	406	727	613
Women, 16 years and older	409	286	305	439	450
16 to 19 years	(1)	(1)	(1)	(1)	217
20 to 24 years	(1)	(1)	252	(1)	309
25 years and older	414	287	323	439	479
<b>Race and Hispanic origin</b>					
White	603	455	324	675	524
Black	399	378	332	394	428
Hispanic origin	438	321	281	(1)	357
<b>Educational attainment</b>					
Less than a high school diploma	398	289	265	(1)	302
High school graduate, no college	512	423	310	491	427
Some college, no degree	581	498	306	522	494
Associate's degree	523	558	433	(1)	519
College graduate	752	521	497	910	769

<sup>1</sup>Data not shown where base is less than 75,000.

Note: Workers with traditional arrangements are those who do not fall into any of the "alternative arrangement" categories.

On-call workers, compared with traditional workers, were more likely to be female (51 percent and 47 percent, respectively). And more of the women who were on-call workers, compared with traditional workers, had children (61 vs. 56 percent). The percentage of on-call workers who were Hispanic was higher than that for the general work-

force (13 vs. 10 percent). Also, about 22 percent of those on call were under the age of 25, compared with 15 percent of traditional workers. Male on-call workers were less likely than other male workers to have graduated from college, whereas female on-call workers were more likely to have a college education.

More than half (53 percent) of on-call workers worked part time in a typical week; only 18 percent of traditional workers did so. Among those 20 years and older, women on call were much more likely (68 percent) than men (28 percent) to work part time.

---

On-call workers who were male were likely employed as construction craftworkers, motor vehicle operators, and cleaners, helpers, and construction laborers. Female on-call workers were most often working as substitute teachers, clerical workers, food preparation workers, nurses, and retail salesclerks.

About half of on-call workers would have preferred a traditional job. Most men gave an economic reason for being on-call workers, and the most often cited reason was that the current job was the only one the individual could find. Most women, on the other hand, gave a personal reason—most often the reason was schedule flexibility.

Among full-time workers, on-call workers who worked full time earned about 85 percent of the median earned by traditional workers. However, women earned only 56 percent of what men earned in on-call arrangements, compared with 78 percent in traditional jobs. Health insurance coverage was reported by about two-thirds of on-call workers, but only 20 percent received it from their current employer. Only 31 percent reported that they were eligible for health insurance coverage from their employer, compared with 73 percent of traditional workers. About one-fourth of on-call workers were eligible for an employer-provided pension; 19 percent were actually included in a plan.

### **Temporary Help Agency Workers**

Temporary help agencies place, screen, evaluate, and sometimes train workers with client organizations. Thus these workers are employed (and paid) by one company while performing work for another. In February 1997, temporary help agencies (including a small number

of agency staff) had 1.3 million employees. The number of workers in this arrangement increased by 10 percent over the 2-year period since February 1995, compared with 2.8 percent for traditional employment.

Workers employed by temporary help agencies were more likely than other workers to be young, female, Black, or Hispanic. Nearly one-fourth were under the age of 25. Only 16 percent were attending high school or college, compared with 43 percent of young people working in a traditional job. A majority of temps had at least 1 year of college—but fewer had a college degree, compared with traditional workers (22 percent and 30 percent, respectively). About 55 percent of temps were female, compared with 47 percent of traditional workers. The percentage of temps who were Black (21 percent) was nearly double that for other workers, and the share who were Hispanic also exceeded that in the general workforce. More Hispanic men than women worked as temps.

Most (80 percent) temps worked a full-time week of at least 35 hours. Among those who worked part time, 41 percent would have preferred a full-time job—compared with only 18 percent of traditional workers. Whereas 41 percent of male temps worked as operators, fabricators, or laborers, about half of female temps held clerical jobs.

Nearly 60 percent of all temps said they would prefer a traditional job. When asked why they were working as temps, 35 percent stated it was the only type work they could find. Also, 18 percent hoped the temporary job would lead to permanent employment. Personal reasons were cited less often by the temps than by independent contractors and on-call workers.

The survey confirmed that people employed by temporary help agencies can be assigned to one client for a relatively long time. The median current tenure in the assignment was about 5 months; the median tenure in the employment arrangement was 6 months. Nearly all temps were assigned to just one client during the reference week; 80 percent were registered with just one temp agency.

Temporary help agency workers had the lowest earnings of workers in the four alternative arrangements for full-time workers. Median earnings were about two-thirds those of traditional workers, reflecting the fact that clerical and machine operator jobs typically held by these workers pay lower-than-average wages. Rates of health insurance coverage and pension benefits were the lowest of the arrangements studied. Only 26 percent of temp workers were eligible for their employer's health insurance coverage, and an even smaller percentage—only 7 percent—obtained health insurance through their employer. Pension coverage was even lower; about 1 temp in 10 was eligible for an employer's pension plan; only 4 percent participated in such a plan.

### **Contract Company Workers**

These individuals worked for a company that provides employees or their services to other organizations under contract. They usually worked for one customer at a time at the customer's work site. This arrangement grew by 24 percent between 1995 and 1997; even so, in February 1997, contract company workers consisted of just 0.6 percent of all workers.

Contract workers were primarily male (70 percent) and between the ages of 25

---

and 44 (65 percent). Among female workers, 66 percent had children. Most contract workers worked full time, but women were much more likely to work part time than were men (36 percent and 8 percent, respectively).

Contract company workers were more likely than workers in traditional arrangements to hold professional, technical, service, and precision-production jobs. Comparatively few held managerial, sales, and clerical positions. One-half of male workers were in service and precision-production occupations, compared with 28 percent of men in traditional arrangements. More than 60 percent of women were in professional and service occupations, compared with 34 percent of women in traditional arrangements.

About 40 percent of contract company workers had worked in the arrangement for 1 year or less. Yet, more than 80 percent believed they could remain indefinitely on their current assignment.

Median weekly earnings for contract company employees were higher than earnings for workers in any other arrangement, including a traditional arrangement for full-time workers. Women, however, earned only 64 percent of men's earnings. Almost 70 percent of contract company workers were eligible for employer-provided health insurance, and one-half received it from their employer—the highest rates of any alternative arrangement. Nearly half of the workers in the arrangement were eligible for their employer's pension plan, and 36 percent participated in the plan. These percentages also were the highest among the alternative arrangements.

## Conclusion

Of the four alternative arrangements examined here, independent contracting was the largest. Generally, workers in this arrangement preferred it to a traditional arrangement, viewed their jobs as permanent, worked full time, and were quite highly paid.

In contrast, many workers in other arrangements might have preferred more job security, higher pay, and more hours. However, each arrangement includes workers who were satisfied with their job situation. Thus there appears to be as much variation in the characteristics of the jobs and workers within each type of employment arrangement as there is between different types of arrangements.

---

Source: Cohany, S.R., 1998, Workers in alternative employment arrangements: A second look, *Monthly Labor Review* 121(11):3-21.



# Factors Affecting Nutrient Intake of the Elderly

The number of Americans age 60 and over is expanding rapidly: from about 5 million in 1900 to about 42 million in 1990, a figure that is expected to more than double by 2030. The elderly, who are about 18 percent of the population, account for about 30 percent of all health care expenditures in the United States.

Poor nutritional status is a primary concern for the elderly. Nutritionally inadequate diets can contribute to or exacerbate chronic and acute diseases and hasten the development of degenerative diseases associated with aging. In the past, it has been difficult to determine the scope of nutritional problems among the aged; however, methods of assessing dietary intake have improved. Providing information on the relationship of socioeconomic and other factors to nutrient intake is basic to improving the health and well-being of the elderly.

The purpose of this study was to estimate the effect of a number of selected characteristics of households and their members on nutrient intake of the elderly. Data were from the U.S. Department of Agriculture's (USDA) 1989-91 Continuing Survey of Food Intakes by Individuals (CSFII). The sample consisted of individuals 60 years of age or older who were the nominal head of their household. In households with both a female and male head of household, only the female's nutrient intake was considered. Elderly individuals who were not nominal heads of households were excluded from this analysis, thus the focus was on those elderly who had some autonomy in

**Table 1. Mean nutrient intake of the elderly and comparison with 1989 Recommended Dietary Allowances<sup>1</sup>**

Nutrient	Women		Men	
	Mean intake	Percent of recommended allowance	Mean intake	Percent of recommended allowance
Energy (kcal)	1,345.3	70.8	1,733.0	75.3
Protein (gm)	56.1	112.2	71.9	114.1
Total fat (gm)	50.6	NA	67.8	NA
Vitamin E (mg)	6.4	80.0	7.3	73.0
Vitamin C (mg)	87.9	146.5	92.3	153.8
Niacin (mg)	16.4	125.4	20.7	138.0
Vitamin B <sub>6</sub> (mg)	1.4	87.5	1.7	85.0
Calcium (mg)	572.5	71.5	693.1	86.6
Phosphorus (mg)	893.2	111.6	1,127.1	140.9
Magnesium (mg)	212.6	75.9	248.6	88.8
Iron (mg)	11.4	114.0	13.9	139.0
Zinc (mg)	8.3	69.2	10.2	85.0

<sup>1</sup>Mean intakes calculated using the 1989-91 CSFII 3-year household weights.

making their food choices. The final sample consisted of 1,373 women and 193 men; their average age was 71.

Multiple regressions were used to explain nutrient intake. Twelve nutrients were selected for study because previous research has found that diets of the elderly are often below recommended levels<sup>1</sup> for these nutrients: Energy, protein, fat, vitamin E, vitamin C, niacin, vitamin B<sub>6</sub>, calcium, phosphorus, magnesium, iron, and zinc. The sample's mean intakes fell below the RDA for energy, vitamins

E and B<sub>6</sub>, calcium, magnesium, and zinc; however, during the 3-day reporting period, the variation was wide (table 1). Among women, over one-third had nutrient intakes below the RDA for energy and for each nutrient (except fat—for which no RDA exists). Among men, over one-third had intakes below the RDA for energy and each nutrient, except niacin and phosphorus (table 2).

Socioeconomic characteristics of elderly individuals that influenced nutrient intake were gender, race, educational attainment, and employment status of the household head. General household characteristics investigated included degree of urbanization, geographic region, socialization available, food stamp participation, and receipt of surplus commodity foods.

<sup>1</sup>Dietary studies frequently define an adequate, nutritious diet as one that fulfills the Recommended Dietary Allowances (RDA). The RDA specify the levels of average intake of nutrients essential for maintaining normal body functioning for a healthy population. Diets under 100 percent of the RDA are associated with, but not necessarily mean, deficiency.

**Table 2. Percentage of elderly falling below 1989 Recommended Dietary Allowances for selected nutrients**

Nutrient	Women	Men
Energy (kcal)	89	83
Protein (gm)	38	37
Vitamin E (mg)	79	80
Vitamin C (mg)	40	48
Niacin (mg)	34	23
Vitamin B <sub>6</sub> (mg)	68	72
Calcium (mg)	82	68
Phosphorus (mg)	41	20
Magnesium (mg)	83	86
Iron (mg)	51	35
Zinc (mg)	87	88

Note: Recommended Dietary Allowances are for adults 51 years of age and over.

Source: *Elderly Heads of Household, Continuing Survey of Food Intakes by Individuals, 1989-91, U.S. Department of Agriculture.*

## Results

### Education

This characteristic of the household head was associated directly with nutritional knowledge and a more balanced diet for individuals in the household. In households with both a female and male head, education of the female head served as a proxy for nutritional knowledge in the household. (In elderly households, it was assumed that the female would be the primary decisionmaker who selected and prepared the food.) Consumption of most of the selected nutrients tended to be related positively to additional formal education and was statistically significant for vitamins C, E, and B<sub>6</sub>, niacin, calcium, phosphorus, and magnesium.

### Region and Degree of Urbanization

Elderly residents in the South consumed fewer calories and less protein, fat, vitamins C and B<sub>6</sub>, niacin, phosphorus, and magnesium than did the elderly in the Northeast. Levels of nutrient intake for elderly residents in the South were not significantly different from those in the Midwest or West, although the Southern elderly consumed more calcium than did the Midwestern elderly. Findings showed that urban elderly residents consumed lower amounts of most nutrients than did nonurban elderly, although this was statistically significant for iron only. The literature reports that the degree of urbanization reflects the potential for the production of home foods, diversity of types of stores, differences in cultural and economic opportunities, and exposure to mass media.

### Socialization

Some researchers theorize that the elderly experience a decrease in appetite and interest in food when they eat alone, with the result being poor nutritional intake. This study examined the size of the household. If the household contained other members, then the opportunity for meal socialization was present. However, this factor was not significant for any nutrient studied.

### Poverty, Food Stamp Participation, and Receipt of Surplus Food

A measure of the household's ability to purchase a nutritionally adequate diet is the amount of household income as a percentage of the appropriate poverty threshold. As reflected by this index, poverty was related to significantly lower intake of all the selected nutrients except vitamin E, calcium, and iron. Use of food stamps increases an individual's food expenditures. And although some researchers have found a significant effect of food stamp participation on nutrient intake, this study found no relationship between the two factors. Similarly, receipt of commodity foods<sup>2</sup> was not a significant factor affecting nutrient intake. These findings have been confirmed in previous studies.

### Race, Age, and Gender of Individual

Results of this study suggest that nutrient consumption by the elderly differs based on race. Compared to elderly Whites, elderly Blacks consumed fewer calories and less total fat, vitamins E and B<sub>6</sub>, niacin, calcium, phosphorus, magnesium, iron, and zinc. Hispanic

<sup>2</sup>Commodity foods are distributed through the Commodity Supplemental Food Program, from which both funds and commodity foods are donated to States to supplement the diets of various target populations, including persons 60 years and older.

---

elderly consumed more protein, compared with elderly Whites. Intake of protein and niacin was significantly higher among the “young” elderly—those between 60 and 70 years old—than it was for those over 70 years old. Compared with elderly men’s diets, those of elderly women were significantly lower in all nutrients studied except for vitamin C.

### **Employment of Head of Household**

Employment of the head of household could reflect a more active lifestyle for elderly residents in the household. In this study, employment status was not significantly related to nutrient intake.

### **Sensitization to the Relationship Between Diet and Health**

The hypothesis stated that a good predictor of nutrient intake might be a person’s knowledge about the relationship between diet and health. Data from the Diet and Health Knowledge Survey, which was conducted among the 1989-91 CSFII households, were linked to information on food consumption, and thus, nutrient intake. This variable had a minimal effect on respondents’ nutrient intake, except for vitamin C and magnesium.

### **Conclusions**

Several characteristics of the elderly and their households influenced their nutrient intake: education, income, urbanization, race, age and gender, and, to some extent, region. These exploratory findings indicate that food and nutrition programs for the elderly would be most effective if directed toward residents in central cities, the less educated, and Blacks. Budgeting and planning low-cost nutritious meals should be emphasized because of the relationship between socioeconomic status (income and education variables) and nutrient intakes.

Nutritional well-being is integral to elders’ overall health, independence, and quality of life. Policymakers need to seek effective methods of achieving optimal nutrition in the older population, and researchers should strive to provide better measurements of the variation in nutrient intake and their relationships to socioeconomic and other factors.

---

Source: Weimer, J.P., 1998, *Factors Affecting Nutrient Intake of the Elderly*, Agricultural Economic Report No. 769, U.S. Department of Agriculture, Economic Research Service.

# The Food Stamp Program After Welfare Reform

The Personal Responsibility and Work Opportunity Reconciliation Act of 1996 (PRWORA) dramatically changed Federal welfare policy. The Act eliminated the entitlement program Aid to Families with Dependent Children (AFDC), replacing it with a fixed block grant that gave States the fundamental role of helping poor families and that added new work requirements for recipients. PRWORA ended eligibility for many aliens and placed time limits on benefits for able-bodied, childless adults. The Congressional Budget Office estimated the savings to the Federal Government to be \$54.2 billion through 2002.

About half of the expenditure cuts directly affect food stamps, now the only Federal entitlement, except for Medicaid, available to all low-income households. Lower transfer payments lead low-income households to reduce their food expenditures, change the types of food consumed, and reduce their expenditures on other goods. Lower food expenditures and changing patterns of food consumption, particularly for children, may have significant effects on nutrition and long-term consequences for cognitive development, medical outlays, and productivity losses.

This study focuses on three interrelated economic phenomena: the implications of decreasing food stamp benefits on food production and consumption and the general economy; the effect of changes in the macroeconomic environment on poverty, Food Stamp Program participation, and budget outlays for food stamps; and the potential for State governments

to shift the burden of supporting the poor to the Food Stamp Program, thereby putting greater emphasis on the Food Stamp Program as a social safety net.

## The Food Stamp Program

Federal spending on food stamps has traditionally exceeded Federal expenditures on both AFDC and housing assistance programs. The Federal Government funds the benefits under the Food Stamp Program but shares costs to administer the program with State and local governments.

To participate in the Food Stamp Program, households must meet eligibility requirements based on citizenship, income, and asset ownership. Gross monthly income of most households cannot exceed 130 percent of the Federal poverty guidelines, which, in 1998, defined the poverty threshold for a family of three (single parent and two children) as \$1,445 per month. Another eligibility requirement states that households may have no more than \$2,000 in assets (\$3,000 if at least one member of the household is age 60 or older). The home, however, is not counted as an asset.

The maximum value of food stamps a household receives varies by household size and is adjusted annually for changes in the cost of the Thrifty Food Plan. Because households are assumed to spend about 30 percent of their income on food, a household's food stamp allotment is equal to the maximum allotment for that household's size, minus 30 percent of the household's net income. In 1996 the average food stamp household received a monthly food stamp benefit of \$174 and had an average of 2.5 people in the household.

The characteristics of households receiving food stamps vary. In 1996, 60 percent of food stamp households had children, 20 percent had disabled persons, and 16 percent had elderly persons. About 60 percent of the children were school-age, and over two-thirds of the adults were women. Over 90 percent of the food stamp households lived in poverty, and most food stamp households with children were headed by a single parent receiving support from TANF—Temporary Assistance to Needy Families Program.<sup>1</sup> About one-quarter of food stamp households had earned income.

For the average food stamp household headed by a single female with two children, food stamps accounted for about 25 percent of the family's household resources. If the nominal dollar value of food stamp benefits is added to income, the distribution of poverty status among food stamp recipients differs significantly (table).

PRWORA stipulated that by 1997, 25 percent of the single-parent families receiving TANF benefits must work at least 20 hours a week, and, by 2002, 50 percent must work at least 30 hours a week. For two-parent families, 90 percent must work a combined 35 hours a week by 1999. If States do not meet these requirements, their grant from the Federal Government will be cut each year—providing States with an impetus to move families into the workplace and off welfare. Under TANF, recipient

<sup>1</sup>Under the block-grant structure of TANF, every State is given a fixed sum of Federal money (based on recent spending levels for AFDC) and, with a wide latitude, the States are free to design how to provide this assistance. For example, instead of cash assistance, States can use funds to set up job training programs to give recipients skills to enter the work force.



## Effect of food stamp benefits on poverty, 1995

Gross income as a percentage of the poverty threshold	Distribution of household income relative to poverty threshold		
	Without food stamps	Food stamps included as income	Percent change
<50%	42	19	-23
50-100%	50	66	16
>100%	9	15	6

Source: U.S. Department of Agriculture, 1998.

families can receive benefits funded by Federal monies for a lifetime total of only 5 years. PRWORA cut more funds from the Food Stamp Program than any other program: through reductions in household benefits and restrictions in eligibility. Expenditures for the Food Stamp Program are projected to decline by about \$22 billion between 1997 and 2002. However, because the Food Stamp Program was not placed under block-granting authority, the program's entitlement status was retained and the national nutritional safety net was preserved.

## Effect of Cuts in Federal Assistance

The net effect of the new law is to decrease significantly outlays for food stamps. Reductions in food stamp benefits will cause low-income families to decrease spending on food and other goods such as housing, clothing, and medical care. The economic effects of cuts in food stamp benefits are not limited to the production and consumption of food but ripple throughout the economy.

The effects of decreasing government transfers to low-income households on food production and consumption, and on the general economy, are estimated in two complementary general equilibrium studies. The studies focus on how changes in relative sectoral profitability affect changes in output, returns, and the flow of resources into and out of the farm sector.

One model simulates the effects on economywide output and employment from reducing Food Stamp Program benefits. Starting from a 1993 base, the model simulates economywide adjustments, given a \$4-billion annual average decline in the Food Stamp Program for 5 years. Although all of the food stamps are spent on food, funds previously spent on food are reallocated to other needs, such as housing, clothing, or medicare. This marginal propensity to consume out of food stamps (called the supplementation effect) implies that the initial effect of a \$23-billion decrease in Food Stamp Program benefits would be a decline of \$5 to \$10 billion over 6 years in retail food spending and a decline of \$18 to \$13 billion over 6 years in nonfood spending.

According to this model, the new welfare legislation may affect the agricultural sector and the general economy in the following ways:

- Retail food spending would decrease;
- Demand for agricultural commodities would decrease;
- Commodity prices and farm income would decrease;
- Capital and labor would be reallocated to nonfood sectors.

In the short run, the economywide effects would be negative. But, if the reduced government expenditures for transfer payments to low-income families are injected back into the economy as a tax cut, the short-term effects are mitigated.

A second model simulates the combined effects of cutting transfer payments and reducing the taxation of capital by decreasing the tax on capital gains. Cutting transfer payments proportionally across all income classes by \$10 billion—while increasing the capital gains exclusion—draws resources into food production, leading to lower prices and an increased consumption of goods and services by all income classes. Proportionally redistributing the budget shortfall over all income classes to offset the tax reduction still leaves sufficient income to increase consumption: expenditures for food, housing, and transportation increase by nearly \$1.5 billion. Food expenditures alone increase by \$535 million. Restoring a 30-percent capital gains exclusion increases national welfare by about \$800 million.

---

## Economic Cycles and the Social Safety Net

Post World War II legislation, such as The Employment Act of 1946, committed the Federal Government to manage overtly the macroeconomy by using welfare as a social safety net during cyclical economic downturns. PRWORA eliminated the entitlement status of welfare benefits. States, therefore, are not obligated to expand programs in times of greatest need. Since funding is primarily through capped block grants to the States, spending for welfare is unlikely to increase when programs need to expand during economic downturns. Hence, it is likely that the Food Stamp Program will become more important as a cyclical safety net.

During a recession, unemployment rates rise and real wages fall. For the average household, the amount of money available for food drops. Food stamps alleviate the situation as more families become eligible—and current recipients qualify for additional food stamps. It is possible, however, for the number of poor to increase without observing an increase in the number of food stamp recipients or for the number of poor to remain constant while observing an increase in the number of food stamp recipients. These changes may occur because not all poor persons qualify for food stamps, and all people below the poverty threshold meet the income test but may not meet the asset test. Also, about 30 to 40 percent of families eligible for food stamps choose not to participate in the program.

The effects of changing macroeconomic conditions on food stamp participation and poverty were estimated. The effect of a 1-percentage point increase in the unemployment rate (combined with a

0.07-percentage point decline in the inflation rate) led to a 0.29-percentage point increase in the food stamp participation rate and a 0.32-percentage point increase in the poverty rate after 1 year. Other simulations illustrate the effects of a mild recession, a more severe recession, and a continued robust economy for the years 1997-2004. Overall, outlays for food stamps increase in each situation because of the trend effects of the number of people in poverty—and the increase occurs most slowly in the case of a continued robust economy.

Since 1992 the growth rate has not been negative during any quarter, and welfare caseloads in every State have declined sharply. The President's Council of Economic Advisors found that 44 percent of the decline was due to economic expansion, and 31 percent was due to changes in the States' welfare programs. Other studies attribute an even higher proportion to economic expansion.

The number of food stamp recipients declined from 25.9 million in January 1996 to 19.3 million in June 1998. Because the U.S. Department of Health and Human Services has determined that 90 percent of AFDC/TANF recipients are also food stamp recipients and families tend to move on and off multiple welfare programs, the decline in food stamp participation must be attributed to both welfare reform and the economic expansion.

If welfare reform has produced permanent changes in welfare caseloads, the effect of future recessions on the rates of food stamp participation will be mitigated. However, if the recent decline in food stamp participation is due primarily to economic expansion, the decline is temporary. Then during the

next recession, the rates of food stamp participation will increase (following historical patterns). As families are forced off TANF because of the expiration of time limits and enter a contracting labor market, incomes will fall and food stamp benefits will increase. Also, if States transfer funds from cash to noncash assistance programs, such as subsidized day care, the income of TANF recipients will fall—leading to an increase in food stamp benefits.

## Fiscal Effect of Block Grants

The 5-year time limit on TANF benefits will eventually force a number of welfare recipients off the TANF welfare program. Unless their TANF income is replaced with wage income, the recipients' net income will decrease, and their food stamp allotment will increase. Also, State welfare programs that shift money away from direct cash assistance (to noncash support such as child-care vouchers, transportation subsidies, and educational programs) will increase the pressure on the Food Stamp Program. Food stamps are a fairly close substitute for cash assistance and 100 percent financed by the Federal Government.

Have State legislatures allowed federally financed food stamp benefits and federally subsidized Medicaid benefits to substitute for AFDC/TANF? No definitive estimate of the effect of block grants on State cash welfare expenditures is possible as yet. A review of literature, however, indicates that "on average State governments will reduce overall spending on AFDC/TANF and Medicaid by approximately 30 percent." Food stamp spending would increase accordingly.

---

## Conclusions

The reform of the U.S. welfare system is having far-reaching effects on the Food Stamp Program. Lower transfer payments lead to reduced expenditures on food, changes in the types of food consumed, and reduced expenditures on other goods by low-income households. The potential economic effects of the new welfare legislation on the agricultural sector and the general economy depend on the size of the reduction in benefits and the form of the program.

Substantial changes in incentives and the structure of the welfare program will increase the prominence of the Food Stamp Program as a cyclical social safety net. Passage of the PRWORA left the Food Stamp Program as one of the only remaining entitlement programs available to almost all low-income households.

---

Source: Gundersen, C., LeBlanc, M., and Kuhn, B., 1999, *The Changing Food Assistance Landscape: The Food Stamp Program in a Post-Welfare Reform Environment*, U.S. Department of Agriculture, Economic Research Service, Agricultural Economic Report No. 773.

## Federal Statistics: Children's Health

Children's health is key to their well-being and future development, both of which may be hindered by several factors. Children whose activities are limited by one or more chronic health conditions may need more specialized care than children without such limitations. Thus access to health care is important. Children with health insurance coverage (either public or private) are more likely than children without coverage to have access to health care. Finally, children's health and development depend on a sufficient diet and the ability of the children's households to have access at all times to enough nourishment for an active, healthy life (food security).

### Most children are in very good or excellent health according to parents:

Parental reports of children's health provide one indicator of children's health status. In 1996 most children (81 percent) were reported to be in very good or excellent health. But these reports of their health status vary by household income. Sixty-five percent of children in families below the poverty line were reported to be in very good or excellent health, compared with 84 percent of children in families living at or above the poverty line.

### Percentage of children under age 18 in very good or excellent health, 1996

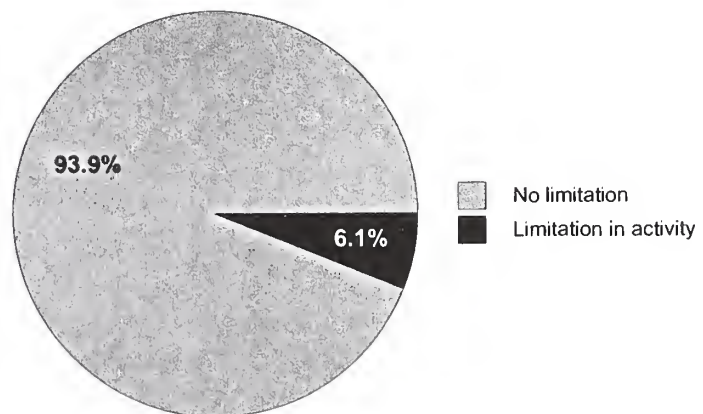


Source: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey, 1996.

### Some children, though, are limited in activity because of health:

In 1996, 6.1 percent of children ages 5 to 17 had a limitation in activity resulting from chronic health conditions. These limitations, reported by the parent, are associated with chronic health conditions (e.g., asthma, hearing impairment, or diabetes) that usually last more than 3 months. Activities that were limited include going to school, playing, and any other activities of children.

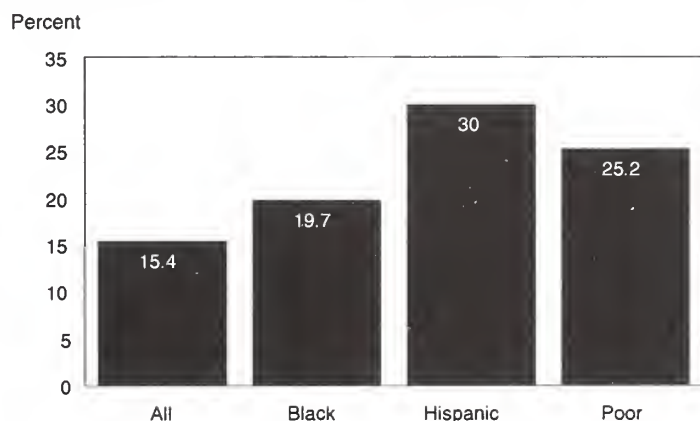
### Distribution of children ages 5 to 17 with any limitation in activity resulting from chronic conditions, 1996



Source: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey, 1996.

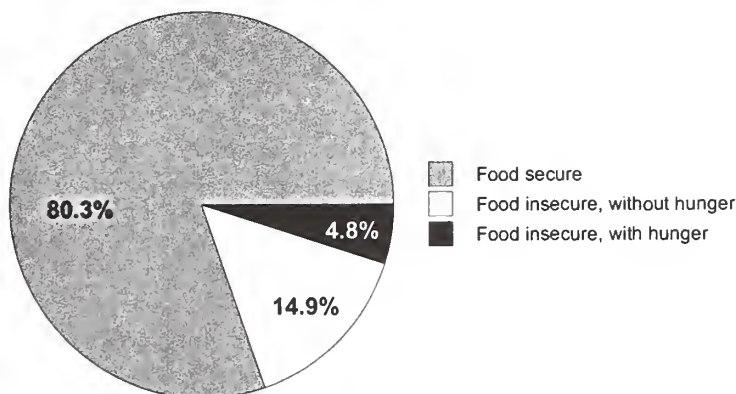


### Percentage of children under age 18 without health insurance coverage, 1998



Source: U.S. Census Bureau, Housing and Household Economic Statistics Division, Current Population Survey, 1998.

### Distribution of children under age 18 in households experiencing food insecurity, 1998



Source: U.S. Department of Agriculture, Economic Research Service and Food and Nutrition Service, 1998 Food Security Supplement to the Current Population Survey.

### Some children are also without health insurance coverage:

Children with health insurance have a greater likelihood of obtaining medical attention to maintain their well-being. In 1998, 15.4 percent of children under age 18 were without health insurance coverage. This percentage was higher for Black children (19.7 percent), Hispanic children (30 percent) who may be of any race, and children in poor households (25.2 percent).

### And some children are food insecure:

Food security includes the ready availability of sufficient, nutritionally adequate, and safe food and the assurance that families can obtain adequate food without relying on emergency feeding programs or resorting to desperate efforts to secure food. In 1998 most children under age 18 (80.3 percent) resided in households that were defined as food secure. However, 14.9 percent of children resided in households experiencing food insecurity without hunger, and 4.8 percent resided in households experiencing food insecurity with hunger. Food insecure households experiencing hunger report having greater difficulty obtaining food and decreased food intakes.

## Research and Evaluation Activities in USDA

### From the Economic Research Service

#### Food Assistance and Nutrition Research Small Grants Program

#### Executive Summaries of 1998 Research Grants

Food assistance programs—Food Stamps, the Special Supplemental Nutrition Program for Women, Infants and Children (WIC), the school meals programs, and others—have been a major component of public assistance to the poor since their origins in the 1930's. Food assistance and nutrition assistance have become increasingly important to the social safety net as a result of welfare reform. To stimulate new research on these programs and to broaden the participation of social science scholars in food and nutrition assistance research, the USDA Economic Research Service (ERS) partnered with five academic institutions and research institutes in 1998 to establish the Small Grants Program for Food and Nutrition Assistance Research. ERS and the partner institutions competitively award small grants for 1-year research projects. What follows is a summary compilation of the research findings related to children from the first set of small grants awarded in the summer and fall of 1998. For a listing of all projects funded and research findings to date, see [www.ers.usda.gov](http://www.ers.usda.gov).

*Nativity, Recency of Migration, and Legal Status Effects on Food Expenditures and Child Well-being*  
Shawn Malia Kanaiaupuni, Department of Sociology, University of Wisconsin and Katharine M. Donato, Department of Sociology, Louisiana State University

Recent years have witnessed growing debate about the integration prospects of U.S. immigrants. Widespread attention has focused on the costs of immigration, especially in cities that suffered from a deep recession in the late 1980's. Since then, public concern about immigrants in the U.S. economy has led to welfare reform that limited public assistance to legal immigrants. Some studies reported that immigrants imposed costs to U.S. taxpayers through their use of educational and welfare services. Steady growth in undocumented migration has accompanied these changes. By the end of the 1980's, estimates suggested a gross inflow of 3.8 million people from Mexico alone, which represented a substantial increase from the estimated 99,000 people two decades earlier.

Research has accumulated considerable evidence about the challenges that confront individuals with uncertain legal status in the United States. Undocumented households tend to be poor, often living below established poverty thresholds. Like other immigrants, those without documents are especially likely to be medically underserved, uninsured, and relying on emergency medical care, all of which increase the risks of preventable death. Many are ineligible or afraid to use public service programs designed to help poor families. Yet to date, primarily because of data limita-

tions, we know little about the effects of undocumented legal status on social behavior and outcomes.

Kanaiaupuni and Donato address this question with new data from a longitudinal, bi-national project (Health and Migration Survey) that surveys households in Mexico and in the United States. The data from this report come from a total of 262 households randomly chosen in two neighborhoods, one in Houston and the other just north of San Diego. They use these data to examine the health effects of legal status, nativity, and recency of migration. Because children are often the ones who suffer the most in non-legal households—they are burdened with the fears and abilities of their parents in addition to overt hostility and discrimination from U.S. residents and institutions—the authors examine the effects of household legal status on child health and food security.

Kanaiaupuni and Donato use multivariate analysis to predict household food expenditures, breastfeeding behavior, current illness, and overall health status of 232 children under age 7 in their sample, all but 40 of whom are U.S. citizens. Their findings provide further evidence of the costs of illegal status for immigrants and their children: children are much better off if both parents have legal documents—having more food, more income, and consequently, better health status. Children with at least one undocumented parent suffer significant health costs. Their chances of poor health are between three and eight times higher than those of children with legal parents. Results also suggest that the advantages conferred by legal status are insensitive

---

to time; net of legal status, children of recent immigrants are no healthier than those whose parents have lengthier U.S. exposure. The authors anticipate future research that will explore the mechanisms that contribute to these results. To date, their findings suggest that children living in undocumented households would benefit from targeted public health, food assistance, and nutrition policies.

***Effects of Participation in Food Assistance Programs on Children's Health and Development: Evidence From NLSY Children***

Lori Kowaleski-Jones, *Department of Family and Consumer Studies, University of Utah* and Greg J. Duncan, *Institute for Policy Research, Northwestern University*

Established in 1972, the goal of the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) has been to increase the nutrition level and general well-being of children. The WIC program is currently one of the fastest growing Federal assistance programs. Program expenditures for WIC have almost tripled in the past two decades, from \$1.3 billion in 1980 to \$3.7 billion in 1997. Part of the popularity of WIC has been because it is one of the most directly targeted and interventionist of the Federal welfare programs. Evaluations of this program testify to its value in reducing infant mortality, rates of low-birth weight, and early childhood anemia. However, many WIC program evaluations were conducted before 1990, and though of high quality, many either relied on data from a single State or compared results across selected States. More current research is needed to examine the potential benefits of WIC participation among a nationally repre-

sentative sample of women and their children.

Much of the previous work on the effects of WIC has focused on infant birth weight, nutrient intakes, presence of anemia, and propensity of mothers to breastfeed their infants. Because of data limitations, fewer studies have estimated the potential effects of WIC participation on developmental infant measures, such as motor and social functioning and temperament. This is unfortunate because developmental outcomes are important predictors of later childhood social and behavioral development.

This study investigates the effects of WIC participation on birth weight, motor and social skills, and temperament for a national sample of children born between 1990 and 1996 to women from the National Longitudinal Survey of Youth. The authors use sibling fixed-effect models to account for potential unmeasured heterogeneity among the mothers of children in this sample. Ordinary Least Square and fixed-effect regression results confirm the positive effect of prenatal WIC participation on infant birth weight found in other studies. Fixed-effect estimates also suggest that prenatal WIC participation is associated with lower scores on measures of difficult temperament.

***Patterns of Food Stamp and WIC Participation and Their Effects on the Health of Low-Income Children***

Bon Joo Lee, *Lucy Mackey-Bilaver, and Robert M. Goerge, Chapin Hall Center for Children, University of Chicago*

The primary purposes of this study are to examine (1) patterns of participation in the Food Stamp Program (FSP) and the Special Supplemental Nutrition Program for Women, Infants, and

Children (WIC) during the time of welfare reform in Illinois; and (2) the effects of WIC on young children's health outcomes. The authors use a unique linked data set based on population-level administrative data on all births, food stamp and WIC participation, and Medicaid eligibility and claims in Illinois between 1990 and 1998.

Lee et al. estimate that about 65 percent of all children born in Illinois during the study period received some combination of WIC, food stamps, and Aid to Families With Dependent Children/ Temporary Assistance for Needy Families (AFDC/ TANF) by age 5. While this overall program participation rate changed very little across birth cohorts, the authors found a considerable shift in participation patterns across the three programs. As welfare reform was implemented in Illinois, both FSP and AFDC/TANF participation rates declined substantially while WIC participation rates continued to increase. Further, most of the decrease in food stamp participation was due to drops in entries to TANF.

The authors found some evidence to suggest that in recent years, families with young children are turning more to WIC to provide essential food items for their young children. They also found that spells of service receipt for both food stamps and WIC have become shorter in recent years, although shorter spells are more noticeable in the Food Stamp Program than in WIC.

Two findings relate to the effects of WIC on health services and outcomes in this study. Lee et al. show first that children receiving WIC are more likely to receive preventive health care services through the Early Periodic Screening, Diagnosis and Treatment program (required of State Medicaid programs through Title XIX



of the Social Security Act) than are those not receiving WIC. Second, among children enrolled in Medicaid, WIC participants are significantly less likely to be diagnosed with health problems associated with inadequate nutrition than are nonparticipants.

***The Consequences of Food Insecurity for Child Well-Being: An Analysis of Children's School Achievement, Psychological Well-Being, and Health***

Lori Reid, Department of Sociology,  
Florida State University

The effect of food insecurity on child well-being has been the subject of much research in developing countries. With a few exceptions, research on food insecurity in the United States has focused on examining the causes of food insecurity, potential solutions, and more recently, on assessing the incidence of food insecurity. Very little research has attempted to analyze the effect of food insecurity on child well-being in the United States. Reid uses the 1997 Child Development Supplement to the Panel Study of Income Dynamics to examine the effects of food insecurity on the school achievement, psychological well-being, and health of children.

The analyses provide evidence that food insecurity affects a child's school achievement and psychological well-being. They do not support a hypothesized negative influence of food insecurity on child health. Reid used children's assessment scores for the letter-word, application, passage comprehension, and calculation subtests of the Woodcock Johnson test as measures for school achievement. She found that food insecurity negatively affects children's scores on the letter-word, passage comprehension, and calculation subtests.

Similarly, using indices of external and internal behavior problems as measures of psychological well-being, her results show food insecurity increases the numbers of both external and internal behavior problems that children exhibit. However, Reid finds no effect of food insecurity on child health when measured by height-for-age and weight-for-age, indicators often used in developing country studies.

***Influence of Food Stamps on the Nutritional Status of Inner-City Preschoolers From Hartford, CT, Who Receive WIC Benefits***

Rafael Perez-Escamilla, Ann M. Ferris, and Linda Drake, Department of Nutritional Sciences, University of Connecticut and Lauren Haldeman, Jessica Peranick, Marcia Campbell, Donna Morgan, Yu-Kuei Peng, Georgine Burke, and Bruce A. Bernstein, Hispanic Health Council, Inc., Hartford Hospital, Connecticut Children's Medical Center and St. Francis Hospital

Perez-Escamilla et al. compare the food and nutrition situations of low-income preschoolers who received food stamps with those who did not. The 100 children participating in the study were recruited in the waiting areas of the two largest hospitals in Hartford. The average age of the sampled children was 2.6 years. Fifty percent were female, and 84 percent were Hispanic. According to their caretakers, all had been enrolled in WIC at some point in the preceding year, and 95 percent were receiving WIC benefits at the time of the study. Groups were comparable in demographic characteristics, but the socioeconomic status of the food stamp group was lower than that of the group that did not receive food stamps.

Perez-Escamilla et al. report that among the food stamp group in their sample, the average monthly food stamp allotment of \$260 represented 96 percent of monthly food expenditures. Seventy-four percent of the households were food insecure as measured by the Radimer/Cornell hunger scale. Among those with monthly household incomes of less than \$1,000, food stamp caretakers tended to be more food secure than non-food stamp caretakers (77.8 vs. 54.5 percent). Logistic regression results indicate that "How long food stamps last each month" was positively associated with food security even after controlling for monthly income, monthly food stamp allotment, household size, maternal education, and vehicle availability. Twenty-four hour recall data indicate that food stamp preschoolers tended to have higher intakes of iron, zinc, and folate than did non-food stamp preschoolers. Among those with monthly household incomes of less than \$1,000, food stamp children had a significantly higher intake of fiber and of riboflavin, niacin, pantothenic acid, B<sub>6</sub>, and D vitamins than did non-food stamp children. Food stamp children also consumed more sodas and had a higher caffeine intake, compared with their counterparts.

The authors draw four conclusions from these results. First, among the very poor, food stamp children live in more food secure households. Second, how long food stamps last is an important determinant of food security. Third, food stamps provide children with higher intakes of essential nutrients. Fourth, they conclude that nutrition education is needed to maximize the nutritional value of foods purchased with food stamps.



## Journal Abstracts

The following abstracts are reprinted verbatim as they appear in the cited source.

**Bartfield, J. 2000. Child support and the postdivorce economic well-being of mothers, fathers, and children. *Demography* 37(2):203-213.**

This article provides national estimates of the current and potential impact of private child support transfers on the economic well-being of custodial and noncustodial families following marital dissolution. Mothers and children fare dramatically worse than fathers after marital dissolution; these differences, however, would be much more pronounced in the absence of private child support. Simulations of four existing child support guidelines show that substantial increases in economic well-being among mother-custody families are possible within the structure of the existing child support system, with minimal impact on poverty among nonresident fathers. Under all of these guidelines, however, custodial-mother families would continue to fare substantially worse than nonresident fathers.

**Greene, A.D. and Moore, K.A. 1999. Nonresident father involvement and child well-being among young children in families on welfare (Abstract No. 159). In H.E. Peters, R.D. Day, and Guest Editors (Eds.) *Fatherhood: Research, Interventions and Policies, Part I. Marriage & Family Review* 29(2/3).**

This study uses early descriptive data from the National Evaluation of Welfare to Work Strategies (NEWS) Child Outcome Study, a sub-study of the

larger random assignment evaluation of the Federal JOBS program, to answer two timely and important questions. First, what factors predict father involvement among nonresident fathers of young children who receive welfare? And second, is nonresident father involvement associated with better outcomes for these children? The three measures of nonresident father involvement examined are father-child visitation, formal child support payments received through the welfare office, and informal child support, such as money given directly to the mother, groceries, clothes, or other items. Findings reveal that while only 16.6% of fathers provided child support through the formal system during the past year, a considerably larger proportion, 42.3%, provided informal child support, and 67% visited at least once in the past year. Informal support and father-child visitation are the most highly correlated forms of involvement, and they share many of the same predictors. Only two predictors are significant and in the same direction for all three measures of nonresident father involvement. Father's residence in the same state as the focal child and the provision of support for the child from the father's family are associated with a higher likelihood of his involvement. In general, findings for the child well-being measures show that monetary and material contributions from the father, especially contributions provided informally, are positively associated with more positive child well-being outcomes.

**Byrd-Bredbenner, C. and Grasso, D. 2000. What is television trying to make children swallow?: Content analysis of the nutrition information in prime-time advertisements. *Journal of Nutrition Education* 32:187-195.**

The purpose of this study was to identify, content analyze, and describe the nutrition-related information (NRI) in commercials aired during the top-rated, prime-time network shows viewed heavily by the age 2- to 11-year-old category. A total of 17.5 hours of programs were videotaped during fall 1998. The NRI in the commercials was content analyzed by two researchers using the instrument developed for this study. Nearly one-quarter of the sampled programming (258 minutes) was used for commercial time. Of the 700 commercials shown, 67% were advertisements for goods and services, 32% were promotions for upcoming television programs, and 1% was public service announcements. One-third of the commercials contained NRI in the form of references that were verbal, written, visual and/or that showed people eating. NRI was most common in advertisements for products and services and was present in all product categories (e.g., electronics, automotive, financial services, foods and beverages). Approximately half of the NRI in food and beverage advertisements (N = 108) was misleading or inaccurate. The most frequently used claim to promote foods and beverages was taste; nutrition promotional claims were used much less often. Television must be recognized

---

as a major source of nutrition (mis-)information. An awareness of the NRI on television can help nutrition educators aid clients in making food choices more in line with current recommendations. This study's findings also point to the need to develop consumer education programs that equip individuals of all ages with the skills needed to assess the validity of nutrition information presented via television. In addition, it is clear that nutrition educators need to advocate for more advertisements for healthful foods and work with advertisers to help them send positive, accurate nutrition messages.

**Keane, C.R., Lave, J.R., Ricci, E.M., and LaVallee, C.P. 1999. The impact of a children's health insurance program by age. *Pediatrics* 104(5): 1051-1058.**

*Objectives.* 1) To examine age variation in unmet need/delayed care, access, utilization, and restricted activities attributable to lack of health insurance in children before they receive health insurance; and 2) to examine the effect of health insurance on these indicators within each age group of children (in years).

*Methods.* We use cohort data on children before and after receiving health insurance. The study population consists of 750 children, 0 through 19 years of age, newly enrolling in two children's health programs. The families of the newly enrolled children were interviewed at the time of their enrollment (baseline), and again at 6 months and 1 year after enrollment. The dependent variables measured included access to regular provider, utilization, unmet need or delayed health care, and restrictions on activities attributable to health insurance status. All these indicator

variables were examined by age groups (0-5, 6-10, 11-14, and 15-19 years of age).  $\chi^2$  tests were performed to determine whether these dependent variables varied by age at baseline. Using logistic regression, odds ratios were calculated for baseline indicators by age group of child, adjusting for variables commonly found to be associated with health insurance status and utilization. Changes in indicator variables from before to after receiving health insurance within each age group were documented and tested using the McNemar test. A comparison group of families of children enrolling newly 12 months later were interviewed to identify any potential effects of trend. *Results.* All ages of children saw statistically significant improvements in access, reduced unmet/delayed care, dental utilization, and childhood activities. Before obtaining health insurance, older children, compared with younger children, were more likely to have had unmet/delayed care, to have not received health care, to have low access, and to have had activities limited by their parents. This pattern held for all types of care except dental care. Age effects were strong and independent of covariates. After being covered by health insurance, the majority of the delayed care, low utilization, low access, and limited activities in the older age groups (11-14 and 15-19 years) was eliminated. Thus, as levels of unmet need, delayed care, and limitations in activities approached zero in all age groups by 1 year after receipt of health insurance, age variation in these variables was eliminated. By contrast, age variation in utilization remained detectable yet greatly reduced.

*Conclusion.* Health insurance will reduce unmet need, delayed care, and restricted childhood activities in all age groups. Health care professionals and

policy makers also should be aware of the especially high health care delay, unmet need, and restricted activities experienced by uninsured older children. The new state children's health insurance programs offer the potential to eliminate these problems. Realization of this potential requires that enrollment criteria, outreach strategies, and delivery systems be effectively fashioned so that all ages of children are enrolled in health insurance.

**Rank, M.R. and Hirschl, T.A. 1999. The economic risk of childhood in America: Estimating the probability of poverty across the formative years. *Journal of Marriage and the Family* 61(4):1058-1067.**

This article estimates the proportion of children in the United States who will experience poverty at some point during their childhood. These proportions are derived through a set of life tables built from 25 waves of longitudinal data. They represent a fundamentally different approach to studying poverty than either a cross-sectional or poverty spell methodology. Our data indicate that between the ages of 1 year and 17 years, 34% of American children will spend at least 1 year below the poverty line, 40% will experience poverty at the 125% level, and 18% will face extreme poverty (below 50% of the poverty line). A series of bivariate and multivariate life tables reveal that race, family structure, and parental education all have a sizeable impact on the likelihood of experiencing poverty. During the 17 years of childhood, 69% of Black children, 81% of children in nonmarried households, and 63% of children whose head of household had fewer than 12 years of education will be touched by poverty.

## Official USDA Food Plans: Cost of Food at Home at Four Levels, U.S. Average, June 2000<sup>1</sup>

AGE-GENDER GROUPS	WEEKLY COST				MONTHLY COST			
	Thrifty plan	Low-cost plan	Moderate-cost plan	Liberal plan	Thrifty plan	Low-cost plan	Moderate-cost plan	Liberal plan
<b>INDIVIDUALS<sup>2</sup></b>								
<b>CHILD:</b>								
1 year	\$15.70	\$19.20	\$22.60	\$27.40	\$68.00	\$83.20	\$97.90	\$118.70
2 years	15.70	19.20	22.60	27.40	68.00	83.20	97.90	118.70
3-5 years	17.00	21.10	26.10	31.30	73.70	91.40	113.10	135.60
6-8 years	21.00	28.10	35.00	40.70	91.00	121.80	151.70	176.40
9-11 years	25.00	31.80	40.80	47.20	108.30	137.80	176.80	204.50
<b>MALE:</b>								
12-14 years	25.80	36.00	44.70	52.60	111.80	156.00	193.70	227.90
15-19 years	26.50	37.20	46.30	53.50	114.80	161.20	200.60	231.80
20-50 years	28.40	36.90	46.10	55.90	123.10	159.90	199.80	242.20
51 years and over	25.70	35.20	43.30	52.00	111.40	152.50	187.60	225.30
<b>FEMALE:</b>								
12-19 years	25.90	31.00	37.80	45.60	112.20	134.30	163.80	197.60
20-50 years	25.80	32.30	39.40	50.50	111.80	140.00	170.70	218.80
51 years and over	25.30	31.40	39.00	46.60	109.60	136.10	169.00	201.90
<b>FAMILIES:</b>								
<b>FAMILY of 2<sup>3</sup>:</b>								
20-50 years	59.60	76.10	94.10	117.00	258.40	329.90	407.60	507.10
51 years and over	56.10	73.30	90.50	108.50	243.10	317.50	392.30	469.90
<b>FAMILY OF 4:</b>								
Couple, 20-50 years and children—								
1-2 and 3-5 years	86.90	109.50	134.20	165.10	376.60	474.50	581.50	715.30
6-8 and 9-11 years	100.20	129.10	161.30	194.30	434.20	559.50	699.00	841.90

<sup>1</sup>Basis is that all meals and snacks are purchased at stores and prepared at home. For specific foods and quantities of foods in the Low-Cost, Moderate-Cost, and Liberal Plans, see *Family Economics Review*, No. 2 (1983); for specific foods and quantities of foods in the Thrifty Food Plan, see *Thrifty Food Plan, 1999, Executive Summary*, CNPP-7A. The Thrifty Food Plan is based on 1989-91 data, and the other three food plans are based on 1977-78 data updated to current dollars using the Consumer Price Index for specific food items.

<sup>2</sup>The costs given are for individuals in 4-person families. For individuals in other size families, the following adjustments are suggested: 1-person—add 20 percent; 2-person—add 10 percent; 3-person—add 5 percent; 5- or 6-person—subtract 5 percent; 7- (or more) person—subtract 10 percent.

<sup>3</sup>Ten percent added for family size adjustment.

## Consumer Prices

Average percent change for major budgetary components

GROUP	Annual average percent change from December of previous year to December:			Percent change 12 months ending with June 2000
	1990	1995	1999	
All Items	6.1	2.5	2.7	3.7
Food	5.3	2.1	1.9	2.3
Food at home	5.8	2.0	1.7	2.2
Food away from home	4.5	2.2	2.3	2.4
Housing	4.5	3.0	2.2	3.2
Apparel	5.1	0.1	-0.5	-2.0
Transportation	10.4	1.5	5.4	8.6
Medical care	9.6	3.9	3.7	4.1
Recreation	NA	2.8	0.8	1.2
Education and communication	NA	4.0	1.6	1.2
Other goods and services	7.6	4.3	5.1	5.4

## Price per pound for selected food items

Food	Price per pound unless otherwise noted (as of December in each year)			June 2000
	1990	1995	1999	
Flour, white, all purpose	\$ .24	\$ .24	\$ .27	\$ .31
Rice, white, long grain, uncooked	.49	.55	.50	NA
Spaghetti and macaroni	.85	.88	.88	.83
Bread, white	.70	.84	.90	.92
Beef, ground, uncooked	1.63	1.40	1.53	1.56
Pork chops, center cut, bone-in	3.32	3.29	3.21	3.33
Chicken, fresh, whole	.86	.94	1.05	1.07
Tuna, light, chunk	2.11	2.00	2.03	1.95
Eggs, Grade A, large, per dozen	1.00	1.16	.92	.84
Milk, fresh, lowfat, per gallon	NA	2.31	2.83	2.64
Butter, salted, grade AA, stick	1.92	1.73	2.27	2.53
Apples, red delicious	.77	.83	.92	.92
Bananas	.43	.45	.49	.51
Oranges, navel	.56	.64	.64	.70
Potatoes, white	.32	.38	.39	.38
Lettuce, iceberg	.58	.61	.67	.69
Tomatoes, field grown	.86	1.51	1.41	1.32
Broccoli	NA	.76	1.00	1.24
Carrots, short trimmed and topped	.43	.53	.52	.59
Onions, dry yellow	NA	.41	NA	NA
Orange juice, frozen concentrate per 16 oz.	2.02	1.57	1.82	1.80
Sugar, white, 33-80 oz. pkg.	.40	.39	.41	.41
Margarine, stick	.87	.79	NA	NA
Peanut butter, creamy	2.09	1.78	1.86	1.89
Coffee, 100% ground roast	2.94	3.51	3.35	3.43

NA = Data not available.

Selected items from CPI Detailed Reports, Bureau of Labor Statistics, various issues. Price changes are for all urban consumers. Food prices are U.S. city average.



# U.S. Poverty Thresholds

Weighted average poverty thresholds<sup>1</sup> for nonfarm families of specified size, 1975-99

Calendar year	Unrelated individuals			Families of 2 persons or more							Annual average CPI, all items (1982-84 = 100)
				2 persons							
	All ages	Under age 65	Age 65 or older	All ages	Householder under age 65	Householder age 65 or older					
1975	\$2,724	\$2,797	\$2,581	\$3,506	\$3,617	\$3,257	\$4,293	\$5,500	\$6,499	\$7,316	53.8
1976	2,884	2,959	2,730	3,711	3,826	3,445	4,540	5,815	6,876	7,760	56.9
1977	3,075	3,152	2,906	3,951	4,072	3,666	4,833	6,191	7,320	8,261	60.6
1978	3,311	3,392	3,127	4,249	4,383	3,944	5,201	6,662	7,880	8,891	65.2
1979	3,689	3,778	3,479	4,725	4,878	4,390	5,784	7,412	8,775	9,914	72.6
1980	4,190	4,290	3,949	5,363	5,537	4,983	6,565	8,414	9,966	11,269	82.4
1981	4,620	4,729	4,359	5,917	6,111	5,498	7,250	9,287	11,007	12,449	90.9
1982	4,901	5,019	4,626	6,281	6,487	5,836	7,693	9,862	11,684	13,207	96.5
1983	5,061	5,180	4,775	6,483	6,697	6,023	7,938	10,178	12,049	13,630	99.6
1984	5,278	5,400	4,979	6,762	6,983	6,282	8,277	10,609	12,566	14,207	103.9
1985	5,469	5,593	5,156	6,998	7,231	6,503	8,573	10,989	13,007	14,696	107.6
1986	5,572	5,701	5,255	7,138	7,372	6,630	8,737	11,203	13,259	14,986	109.6
1987	5,778	5,909	5,447	7,397	7,641	6,872	9,056	11,611	13,737	15,509	113.6
1988	6,024	6,155	5,674	7,704	7,958	7,158	9,435	12,092	14,305	16,149	118.3
1989	6,311	6,451	5,947	8,076	8,343	7,501	9,885	12,675	14,990	16,921	124.0
1990	6,652	6,800	6,268	8,512	8,794	7,906	10,419	13,360	15,800	17,835	130.7
1991	6,932	7,086	6,532	8,867	9,164	8,238	10,857	13,921	16,457	18,590	136.2
1992	7,141	7,299	6,729	9,132	9,441	8,489	11,187	14,343	16,951	19,146	140.3
1993	7,357	7,517	6,930	9,410	9,726	8,741	11,521	14,764	17,459	19,710	144.5
1994	7,551	7,710	7,107	9,655	9,977	8,964	11,817	15,141	17,896	20,223	148.2
1995	7,761	7,929	7,309	9,935	10,259	9,221	12,156	15,570	18,407	20,808	152.4
1996	7,992	8,163	7,525	10,226	10,562	9,491	12,517	16,029	18,951	21,418	156.9
1997	8,178	8,350	7,698	10,468	10,806	9,709	12,803	16,404	19,387	21,880	160.5
1998	8,310	8,480	7,818	10,636	10,973	9,863	13,001	16,655	19,682	22,227	163.0
1999 <sup>2</sup>	8,500	8,667	7,991	10,869	11,214	10,080	13,290	17,028	20,115	22,719	166.6

<sup>1</sup>The **poverty thresholds** are used by the Bureau of the Census to prepare its statistical estimates of the number of individuals and families in poverty. The **poverty guidelines** are a simplified version of these poverty thresholds and are issued by the U.S. Department of Health and Human Services for administrative purposes. The poverty guidelines are used to determine whether a person or family is financially eligible for assistance or services under a particular Federal program.

<sup>2</sup>These average poverty thresholds were derived by increasing the 1998 thresholds by a factor of 1.022086, which reflects the percent change in the average annual Consumer Price Index (CPI-U) between 1998 and 1999.

## Index of Authors in 1999 Issues

<i>Author</i>	<i>Article Title</i>	<i>Issue No.</i>	<i>Page No.</i>
Abdel-Ghany, Mohamed	Identifying the Poor and Their Consumption Patterns	2	15
Anand, Rajen	Cruciferous Vegetables and Human Breast Cancer: An Important Interdisciplinary Hypothesis in the Field of Diet and Cancer	2	26
Anand, Rajen S.	Report Card on the Diet Quality of Children	3/4	78
Anand, Rajen S.	Eating Breakfast Greatly Improves Schoolchildren's Diet Quality	3/4	81
Basiotis, P. Peter	Report Card on the Diet Quality of Children	3/4	78
Basiotis, P. Peter	Eating Breakfast Greatly Improves Schoolchildren's Diet Quality	3/4	81
Bente, Lisa	Household Expenditures on Vitamins and Minerals by Income Level	2	39
Biedebach, Mark	Cruciferous Vegetables and Human Breast Cancer: An Important Interdisciplinary Hypothesis in the Field of Diet and Cancer	2	26
Bowman, Shanthly A.	Diets of Individuals Based on Energy Intakes From Added Sugars	2	31
Dinkins, Julia M.	Household Expenditures on Vitamins and Minerals by Income Level	2	39
Escobar, Alyson	Factors Influencing Children's Dietary Practices: A Review	3/4	45
Escobar, Alyson	Are All Food Pyramids Created Equal?	3/4	75
Gates, Gail E.	Folate Intake and Supplement Use in Women of Childbearing Age	1	14
Gerrior, Shirley	Trends in Availability of Foods and Nutrients: A Comparison Between the United States and Italy, 1961-92	1	26
Gerrior, Shirley A.	Dietary Changes in Older Americans From 1977 to 1996: Implications for Dietary Quality	2	3
Gerrior, Shirley A.	Report Card on the Diet Quality of Children	3/4	78
Holmes, Tawni W.	Folate Intake and Supplement Use in Women of Childbearing Age	1	14
Jevning, Ron	Cruciferous Vegetables and Human Breast Cancer: An Important Interdisciplinary Hypothesis in the Field of Diet and Cancer	2	26
Kendall, Anne	Nutrition and Dairy Industry Benefits Associated With Promoting Lowfat Milk: Evidence From the 1989 CSFII	1	3
Khan, Laura Kettel	Nutrition and Dairy Industry Benefits Associated With Promoting Lowfat Milk: Evidence From the 1989 CSFII	1	3
Lino, Mark	Household Expenditures on Vitamins and Minerals by Income Level	2	39
Lino, Mark	Expenditures on Children by Families, 1999	3/4	56
Lino, Mark	Report Card on the Diet Quality of Children	3/4	78
Lino, Mark	Eating Breakfast Greatly Improves Schoolchildren's Diet Quality	3/4	81
Marcoe, Kristin L.	Technical Research for the Food Guide Pyramid for Young Children	3/4	18
Mathios, Alan	Nutrition and Dairy Industry Benefits Associated With Promoting Lowfat Milk: Evidence From the 1989 CSFII	1	3
Nayga Jr., Rodolfo M.	Factors Associated With the Intake of Dietary Supplements	1	43
Pelletier, David L.	Nutrition and Dairy Industry Benefits Associated With Promoting Lowfat Milk: Evidence From the 1989 CSFII	1	3
Reed, Debra B.	Factors Associated With the Intake of Dietary Supplements	1	43
Saltos, Etta	Adapting the Food Guide Pyramid for Children: Defining the Target Audience	3/4	3
Sharpe, Deanna L.	Identifying the Poor and Their Consumption Patterns	2	15
Tarone, Catherine	Consumer Research: Food Guide Pyramid for Young Children	3/4	33
Zizza, Claire	Trends in Availability of Foods and Nutrients: A Comparison Between the United States and Italy, 1961-92	1	26

# Index of Articles in 1999 Issues

Issue No. Page No.

## Food and Nutrition

Nutrition and Dairy Industry Benefits Associated With Promoting Lowfat Milk: Evidence From the 1989 CSFII	1	3
Folate Intake and Supplement Use in Women of Childbearing Age	1	14
Trends in Availability of Foods and Nutrients: A Comparison Between the United States and Italy, 1961-92	1	26
Factors Associated With the Intake of Dietary Supplements	1	43
The Diet Quality of Americans: Strong Link With Nutrition Knowledge	1	49
Dietary Changes in Older Americans From 1977 to 1996: Implications for Dietary Quality	2	3
Diets of Individuals Based on Energy Intakes From Added Sugars	2	31
The Diet Quality of American Indians: Evidence From the Continuing Survey of Food Intakes by Individuals	2	44
Factors Influencing Children's Dietary Practices: A Review	3/4	45
Technical Research for the Food Guide Pyramid for Young Children	3/4	18
Consumer Research: Food Guide Pyramid for Young Children	3/4	33
Adapting the Food Guide Pyramid for Young Children: Defining the Target Audience	3/4	3
Are All Food Pyramids Created Equal?	3/4	75
Report Card on the Diet Quality of Children	3/4	78
Eating Breakfast Greatly Improves Schoolchildren's Diet Quality	3/4	81
*Contribution of Away-From-Home Foods to American Diet Quality	3/4	85

## Expenditures and Economic Status

*Earnings of Husbands and Wives in Dual-Earner Families	1	54
*Retirement Prospects of Baby Boomers	1	56
Identifying the Poor and Their Consumption Patterns	2	15
Household Expenditures on Vitamins and Minerals by Income Level	2	39
*Supplemental Security Income Program Participation by Noncitizens	2	47
*Who Gained the Most During the 1990's Expansion?	2	55
*The Food-at-Home Budget: Changes Between 1980 and 1992	2	57
Expenditures on Children by Families, 1999	3/4	56
*Access to Supermarkets and Large Grocery Stores by the Rural Poor	3/4	90
*Poverty and Well-Being in Rural America	3/4	93
*Alternative Employment Arrangements	3/4	96
*The Food Stamp Program After Welfare Reform	3/4	104

## Health

Facts About Childhood Obesity and Overweightness	1	52
*Clinical Guidelines: Identification, Evaluation, and Treatment of Overweight and Obesity in Adults	1	59
Cruciferous Vegetables and Human Breast Cancer: An Important Interdisciplinary Hypothesis in the Field of Diet and Cancer	2	26
*A Dietary Assessment of the U.S. Food Supply	2	51
*Factors Affecting Nutrient Intake of the Elderly	3/4	101

*Family Economics and Nutrition Review*  
*gratefully acknowledges the reviewers of manuscripts for 1999 issues.*

Jane Allshouse  
Economic Research Service  
U.S. Department of Agriculture

Shanthy Bowman  
Agricultural Research Service  
U.S. Department of Agriculture

Karen M. Chapman-Novakofski  
University of Illinois

Cecilia Enns  
Agricultural Research Service  
U.S. Department of Agriculture

Nancy Ernst  
National Institutes of Health

Lesley Fels Tinker  
Fred Hutchinson Cancer Research Center

Pamela S. Haines  
The University of North Carolina at Chapel Hill

Patricia Hammerschmidt  
Michigan State University

Lisa Harnack  
University of Minnesota

Ann Hertzler  
Virginia Polytechnic Institute & State University

Katrina A. Holt  
Georgetown University

Joyce Jones  
Kansas State University

Phillip R. Kaufman  
Economic Research Service  
U.S. Department of Agriculture

Ruth Kava  
American Council on Science & Health

Sue Krebs-Smith  
National Cancer Institute

Michele Lawler  
Maternal and Child Health Bureau

Brenda Lisi  
Maternal and Child Health Bureau

Calvin McCausland  
Enrich International, Inc.

Sharon Mickle  
Agricultural Research Service  
U.S. Department of Agriculture

Rodolfo M. Nayga Jr.  
Texas A&M University

James P. O'Halloran  
Neurocomp Systems

Carol Olander  
Food and Nutrition Service  
U.S. Department of Agriculture

John Park  
Cornell University

Bill Passero  
Bureau of Labor Statistics  
U.S. Department of Labor

Jean Pennington  
National Institutes of Health

Barry Popkin  
The University of North Carolina at Chapel Hill

Jeanie Rader  
U.S. Food and Drug Administration

Jean Skinner  
University of Tennessee

Janice Stuff  
ARS Children's Nutrition Research Center  
U.S. Department of Agriculture

Katherine Sykes  
Agricultural Research Service  
U.S. Department of Agriculture

Susan Welch  
Cooperative Research Education and Extension Service  
U.S. Department of Agriculture

Wells Willis  
Cooperative Research Education and Extension Service  
U.S. Department of Agriculture



---

## Center for Nutrition Policy and Promotion U.S. Department of Agriculture

Access CNPP's home page at: <http://www.usda.gov/cnpp>

Below are the options you will see:

- Dietary Guidelines for Americans, 2000, 5th Edition
- Interactive Healthy Eating Index
- Recipes and Tips for Healthy, Thrifty Meals
- About CNPP
- How to Get Information from CNPP
- Nutrition Insights
- Dietary Guidelines for Americans
- Food Guide Pyramid
- Food Guide Pyramid for Young Children
- USDA Healthy Eating Index
- Expenditures on Children by Families
- Family Economics and Nutrition Review
- Nutrient Content of the U.S. Food Supply
- Official USDA Food Plans
- Childhood Obesity Symposium Proceedings
- Symposium on Breakfast and Learning in Children: Symposium Proceedings
- Nutritional Status of WIC Participants Study
- DAP (Dietary Analysis Program)
- Miscellaneous Files
- Video Archives in Real Video
- USDA Nondiscrimination Statement

For more information, contact the Center:  
USDA, Center for Nutrition Policy and Promotion  
1120 20th Street NW, Suite 200 North Lobby  
Washington, DC 20036  
Phone: (202) 418-2312



Order Processing Code:

Superintendent of Documents Order Form

Charge your order.

It's Easy!

**\*5875**

To fax your orders (202) 512-2233

☐

**YES**, enter my subscription as follows:

\_\_\_\_\_ subscriptions to **FAMILY ECONOMICS AND NUTRITION REVIEW (FAMER)** for \$12.00 per year (\$15.00 foreign).

(NOTE: Formerly **FAMILY ECONOMICS REVIEW**)

The total cost of my order is \$\_\_\_\_\_. Price includes regular domestic postage and handling and is subject to change.

\_\_\_\_\_  
(Company or personal name)

\_\_\_\_\_  
(Please type or print)

\_\_\_\_\_  
(Additional address/attention line)

\_\_\_\_\_  
(Street address)

\_\_\_\_\_  
(City, State, ZIP Code)

\_\_\_\_\_  
(Daytime phone including area code)

\_\_\_\_\_  
(Purchase Order No.)

**For privacy protection, check the box below:**

☐

Do not make my name available to other mailers.

**Please choose method of payment:**

☐

Check payable to the Superintendent of Documents

☐

GPO Deposit Account

☐☐

VISA or MasterCard Account

☐☐

(Credit card expiration date)

*Thank you for  
your order!*

\_\_\_\_\_  
(Authorizing Signature)

Mail to: New Orders, Superintendent of Documents  
P.O. Box 371954, Pittsburgh, PA 15250-7954





## Guidelines for Authors

*Family Economics and Nutrition Review* is a peer-reviewed quarterly journal published by the Center for Nutrition Policy and Promotion; Food, Nutrition, and Consumer Services; U.S. Department of Agriculture.

- All manuscripts must follow the guidelines of *Publication Manual of the American Psychological Association*, 4th Edition.
- The manuscript text for **feature articles**, including references, abstract (less than 150 words), tables, and figures, is limited to 30 pages. Include a separate title page with author's full name, title, affiliation, full address, and telephone number.
- The manuscript text for **research briefs**, including references, tables, and figures, is limited to 10 pages. No abstract is required.
- Include tables or figures only if they are necessary to understand or clarify the paper. No more than six figures and/or tables will be published with an article, and no more than three will be published with a research brief.
- Manuscripts may not be submitted elsewhere while under consideration by the journal.
- All authors and coauthors must sign a release acknowledging that contents of the journal are in the public domain.
- Upon acceptance of articles, authors must send the revised manuscript on computer disk, along with two hard (paper) copies. WordPerfect is the preferred word-processing program.
- Please send four copies to the editor:  
Julia M. Dinkins, PhD  
*Family Economics and Nutrition Review*  
USDA, Center for Nutrition Policy and Promotion  
1120 20th Street NW, Suite 200 North Lobby  
Washington, DC 20036-3406  
(202) 606-4876

# Family Economics and Nutrition Review

## Editorial Board

**Cheryl Achterberg**

The Schreyer Honors College  
The Pennsylvania State University

**Ronette Briefel**

Mathematica Policy Research, Inc.

**Robin Douthitt**

Department of Consumer Sciences  
University of Wisconsin-Madison

**David B. Eastwood**

Department of Agricultural Economics  
and Rural Sociology  
University of Tennessee

**Jay Hirschman**

Food and Nutrition Service  
U.S. Department of Agriculture

**Eileen Kennedy**

Research, Education, and Economics  
U.S. Department of Agriculture

**Joyce Jones**

Family Studies and Human Services  
Kansas State University

**Alan S. Levy**

Center for Food Safety and Applied Nutrition  
U.S. Food and Drug Administration

**Suzanne Murphy**

Cancer Research Center of Hawaii  
University of Hawaii

**Rodolfo Nayga**

Department of Agricultural Economics  
Texas A&M University

**Jane Schuchardt**

Research, Education, and Economics  
U.S. Department of Agriculture

**David Smallwood**

Economic Research Service  
U.S. Department of Agriculture

**Wells Willis**

Research, Education, and Economics  
U.S. Department of Agriculture